

C 1

Investigation of the dimeric association of fatty acids by the method of Raman scattering. M. I. Batuev (Acad. Sci., U.S.S.R.). *Izv. Akad. Nauk S.S.S.R., Ser. Fiz.* 12, 611-15(1948); cf. C.A. 42, 3261g, 6664a. —When formic acid is dissolved in  $\text{CCl}_4$  the Raman frequencies 2926, 2943, and 2956  $\text{cm}^{-1}$  can be observed, the first of which belongs to the C—H group, the two others to the O—H group of a dimeric ring. In 10-15% solns. of formic acid in  $\text{H}_2\text{O}$  these lines are diffused to a band because of the breakup of the dimers, which is however not complete since C—H group lines 1000 and 1710  $\text{cm}^{-1}$  still persist. In  $\text{HCOOH}$  vapor at 60° there appears next to the dimeric frequency the O—H frequency of monomeric  $\text{HCOOH}$  at 3563  $\text{cm}^{-1}$ . At 140° the O—H frequencies of the ring disappear; the 2926 line of C—H and the 3563 line of monomeric O—H are the only ones present. In liquid  $\text{HOAc}$  the intensely polarized 2914  $\text{cm}^{-1}$  line belongs to the symmetric, the line 2901  $\text{cm}^{-1}$  to the antisymmetric vibration of the C—H group. The lines 2900 and 3024  $\text{cm}^{-1}$  are attributed to the O—H group of the dimeric ring because they are not present in  $\text{H}_2\text{O}$  soln. (where the dimers are broken up) and they still exist in low (5%) concn. in  $\text{CCl}_4$ , the dimers being present in such solns. These results confirm previously found differences in polymerization between  $\text{HOAc}$  and  $\text{HCOOH}$  as one group and the other fatty acids as another group. S. Pakswar

CA

3

Investigation of the hydrogen bond of aqueous solutions of hydrazides by the method of combination scattering of light. M. I. Ratush. Doklady Akad. Nauk S.S.S.R. 59, 715 (1948); Chem. Zvest. (Russian Zone Ed.) 1948, 11, 1259; cf. C.A. 38, 6191; 41, 1841; 42, 3201g. In the spectra of highly concd. aq. solns. of KOH and NaOH (40 wt.-%) there appears on the short-wave edge of the wide H<sub>2</sub>O band a sharply prominent, although somewhat broadened line at 3670 cm.<sup>-1</sup>. This line gradually fades with decreasing concn. (down to 0.5 wt.-%) and disappears. In its place a faint band appears at about 3650 cm.<sup>-1</sup>. These findings indicate that the quasicryst. structure is present in concd. solns. and is destroyed with increasing diln. and dis-socn. The OH ion forms H bonds even in cryst. and quasicryst. lattices; therefore, it is not a free ion. The high-frequency OH<sup>-</sup> band is absent in the spectrum of pure, distd. water kept in quartz vessels. The different chem. nature of the OH groups of acids and of bases is apparent from the fact that the optical evidence of the H bond appears at a higher frequency in bases (3200-3600 cm.<sup>-1</sup>) than in acids (3000-2800 cm.<sup>-1</sup>). M. G. Moore

No. 4

1257

BATUYEV, M. I?

"Development of Annular Dimeric Association of Fatty Acids in Spectra of Combination Dispersion of Light by the Hydroxyl Group," Dok. AN, 59, No. 6, 1948. (Inst. of Org. Chem., Mbr. Acad. Sci.) c1948

BATUYEV, M. I.

USSR/Chemistry - Aromatization  
Chemistry - Catalysts, Chromium

1 Mar 1948

"Aromatization of Diallyl on Chromium Catalysts," A. F. Plate, M. I. Batuyev, Inst. Org. Chem, Acad Sci USSR, 4 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LIX, No 7

Experiments made on the isomerization of diallyl into dipropenyl over catalyzer of  $\text{Cr}_2\text{O}_3/\text{Al}_2\text{O}_3$  at 300 and 400°: Show that in these conditions benzene is formed, the content of which is 6% in catalyzate obtained at 300° and 11% at 400°. Show that application of refractometric methods of analysis to determine the dipropenyl in catalyzates obtained in isomerization of diallyl on oxide catalyzers that can cause aromatization may lead to errors as result of benzene content in the catalyzers. Submitted by Academician B. A. Kazanskiy, 6 Dec 1947.

PA47T11

PROCESSING AND PREPARATION

3

**Evidence of cyclic dimeric association of fatty acids in the Raman spectra of the hydroxyl group.** M. L. Baizy (Inst. Org. Chem. Acad. Sci. U.S.S.R., Moscow). *Doklady Akad. Nauk S.S.S.R.* 59, 1117-20(1949); cf. C.A. 42, 3261g. - The diffuse band which appears in  $\text{HCO}_2\text{H}$  in the region where, in excitation by the Hg triplet 27,388, 27,353, 27,297  $\text{cm}^{-1}$ , one observes in  $\text{AcOH}$  the sharp C-H triplet 2944  $\text{cm}^{-1}$ , is actually due to a superposition of the O-H frequency of the cyclically dimerized  $\text{HCO}_2\text{H}$  on the C-H frequency. In soln. in  $\text{CCl}_4$  in which the ring dimer is sol., the band disappears and, in its stead, one observes the sharp doublet 2942, 2936, with a fainter 3rd line 2934  $\text{cm}^{-1}$ . The same lines are found in  $\text{HCO}_2\text{H}$  vapor at about 90°, whereas at 140°, where decompn. into monomers is complete, the doublet disappears and only the C-H line 2934 persists; at the same time, the new O-H frequency 3563 of the monomer appears. The disappearance of the 2942, 2936 doublet at 140° proves that it belongs to the O-H of the cyclic dimer, and that, in the liquid phase, C-H takes no part in hydrogen bonding. On soln. in  $\text{H}_2\text{O}$ , in contrast to  $\text{CCl}_4$ , the band is not resolved into lines, only becomes more diffuse and is shifted to longer waves. Likewise, in soln. of  $\text{HCO}_2\text{H}$  in  $\text{CCl}_4$ , one observes the C:O frequency 1690 of the dimer, in  $\text{H}_2\text{O}$  only the line 1713; the same difference is found for the C:O frequency of  $\text{AcOH}$  in  $\text{CCl}_4$  and in  $\text{H}_2\text{O}$ . Of the 4 lines (in the order of decreasing intensity), 2944, 2936, 2930, and 3028  $\text{cm}^{-1}$ , observed in liquid  $\text{AcOH}$ , in the C-H region, against a background of the O-H band of the polymer, the doublet 2940 and 3028 is ascribed to O-H of the dimer ring, mainly on the basis of its observed disappearance (along with the polymeric OH background) at 200° (where decompn. into monomers is complete), accompanied by the appearance of the new monomeric O-H frequency 3578  $\text{cm}^{-1}$ . Further proof is seen in the fact that the 2990, 3028 doublet is preserved in dil. (5%) solns. of  $\text{AcOH}$  in  $\text{CCl}_4$  and in liquid  $\text{AcOH}$  heated to 100°, while the OH band of the polymer is absent. On soln. in dioxane and in  $\text{H}_2\text{O}$ , the ring dimers are broken up and new hydrogen-bonded chain complexes are formed between  $\text{AcOH}$  and dioxane molcs.; the OH doublet of the cyclic dimer is replaced by a diffuse band. The O-H vibration of the monomer, the ring dimer, and the polymer appears, resp., in the form of a sharp line, a diffuse doublet, and a broad band; the corresponding wave nos., in  $\text{HCO}_2\text{H}$ ,  $\text{AcOH}$ , and  $\text{Me}_2\text{CHCH}_2\text{CO}_2\text{H}$ , are: monomer, 3563, 3578, and 3572; dimer 2942, 2936; 2940, 3028, and 3120, 3185; polymer 2700, 2700-3000, and none.

N. Thon

250-524 METALLURGICAL LITERATURE CLASSIFICATION

627-12-12

BATUEV, M. I.

Aromatization of biallil on a chrome catalyst. A. P. Plate and M. I. Batuev. *Doklady Akad. Nauk S.S.S.R.* 59, 1305-8(1948).—Biallil (from Mg and  $\text{CH}_2\text{:CHCH}_2\text{Cl}$ ),  $n_D^{20}$  57.9-58°,  $d_4^{20}$  0.8929,  $n_D^{20}$  1.4038, passed over a  $\text{Cr}_2\text{O}_3\text{-Al}_2\text{O}_3$  catalyst (15:85 mol. %) in a 9.5-mm. tube with 20 ml. catalyst vol. at 300° and 10.6 ml./hr. flow rate, gave 7.5 g. catalyzate (from 9.2 g. hydrocarbon),  $n_D^{20}$  1.4286; at 400° and 17 ml./hr. flow rate, 13.8 g. gave 10.2 g. product,  $n_D^{20}$  1.4278; the 1st batch contained 81% benzene, the 2nd 11% (by optical analysis). Passage of biallil over com.  $\text{Al}_2\text{O}_3$  at 300-3° with 1.0 space velocity gave 60% *biisoprenyl*,  $n_D^{20}$  81.3-2.5°,  $d_4^{20}$  0.7202,  $n_D^{20}$  1.4534.  
G. M. Kosolapoff

~~RESTRICTED~~  
BATUYEV, M. I.

KAZANSKIY, B. A., LIBERMAN, A. L. and BATUYEV, M. I.  
(Academy of Sciences)

CA: 42-8448/h

Doklady Akad. Nauk SSSR 61, No. 1 / 67-70 (1948)

Cyclization of paraffin hydrocarbons with a quaternary carbon atom, and  
mechanism of the aromatization of paraffins on platinized carbon.

~~RESTRICTED~~

BATUYEV, M. I.

USSR/Chemistry - Cyclopentane, Derivatives  
Chemistry - Bicyclo-(1,2,2)-Heptane

Sep 48

"Structure of Bicyclo-(1,2,2)-Heptane," Acad B. A. Kazanskiy, A. V. Koperina, M. I. Batuyev, 4 pp

"Dok Ak Nauk SSSR" Vol LXII, No 3

Discussion of experimental data on conversion of bicyclo-(1,2,2)-heptane, largely obtained in authors' laboratory, points out that it should be considered a cyclopentane derivative and not a cyclohexane with a methylene bridge connecting carbons 1 and 4. Submitted 6 Aug 48.

PA 36/49T13



~~REDACTED~~

Batuyev, M. I.

(Inst. Org. Chem. USSR, Academy of Sciences)

Compt. rend. acad. sci. URSS 59, 913-6 (1948)

Vibration frequency of the hydroxyl group of fatty acids in the gas phase in Raman spectra.

~~REDACTED~~

BATUYEV, M. I.

"A Complex Method of Detailed Investigation of the Individual Composition of Gasolines"  
(Kompleksnyy Metod Detalizirovannogo Issledovaniya Individual'nogo Sostava Benzinov),  
G. S. Landsberg, B. A. Kazanskiy, P. A. Bashulin, M. I. Batuyev, A. L. Liberman,  
A. S. Plate, and G. A. Tarasova, edited by V. S. Fedorov, Gostoptekhizdat,  
Moscow/Leningrad, 1949, 68 pages, 3 rubles.

Subject method is based on spectral analysis.

SO: Uspekhi Khimii, Vol 18, #6, 1949; Vol 19, #1, 1950 (W-10083)

15.07.1969, M.S.

38006. BATUYEV, M. I., BORISOV, A. YE., AND NESMEYANOV, AN.

SFYEKTRY KOMBINATSIONNOGO RASSYEYANIYA SVYATA KHLORVINIL'NYKH PROIZVODNYKHRTUTI  
I SUR'MY. IZVYESTIYA AKAD NAUK SSSR, OTD-NIYE KHIM. NAUK, 1949,  
No. 6, S. 567-69. - BIBLIOGR: S. 569

CA

No. 12

Frequency-modulation theory of the hydrogen bond.  
M. L. Batur (Acad. Sci. U.S.S.R., Moscow) *Zhur. Fiz. Khim.* 25, 1300-404 (1949); cf. *C.A.* 42, 6064a. —The frequency-modulation theory of telecommunication is applied to the H bond. Intermol. vibrations alter the

frequency  $\nu$  of intramol. vibrations. The  $\nu$  of the former  $\nu$ , e.g., 0.1 or 0.01 of that of O-H vibrations. The latter  $\nu$  may be modified to a series of discrete frequencies or to vibration bands, and the modified  $\nu$  can be greater than the original. This is observed in the OH spectra of secondary and tertiary aliphatic alcoh., etc.; the older theories of the H bond could not account for this shift of  $\nu$ . J. J. H.

CA

Optical study of hydroxyl groups differing in their chemical nature. Determination of the potential barrier to the proton transfer in systems  $O-H...O$ . M. J. Ratuev (Acad. Sci. U.S.S.R., Moscow). *Zhur. Fiz. Khim.* 23, 1405-9 (1949); cf. preceding abstr.—Literature data exist for the frequencies  $\nu$  and the bond energies  $E$  of the  $O-H$  ion,  $O-H$  in monomer  $H_2O$ , and in  $O-H^+$  radical. If the curve of  $E$  against  $\nu$  is extrapolated to lower  $\nu$ , the following  $E$  values are obtained: hydrated  $O-H^+$  127,  $H_2CO_3$  85, cyclic dimer of  $HCO_2H$  73,  $HCO_2H$  60,  $\beta$  crystals of  $(CO_2H)_2$  51 kcal./mole. With Morse's equations (C. J. 33, 540) the potential barrier to proton transfer from one to another identical mol. is calcul.; it is, e.g., 67 kcal./mole for hydrated  $O-H^+$  and 5 kcal. ( $CO_2H$ ). Proton resonance is possible only if  $\nu$  of the  $O-H$  bond is  $< 2400$  cm.<sup>-1</sup> and  $E < 50$ . J. J. Bierman

BATUYEV, M. I.

"Destructive Hydrogenation of Isobutylene Polymers," Dok. AN, 64, No. 3, 1949.

"Spectra of Combination Light Scattering of Chlorovinyl Derivatives of Mercury and Antimony, Iz. Ak. Nauk SSSR, Otdel. Khim. Nauk, 6, 1949

C.A

The composition and structure of diisobutylenes and triisobutylenes formed from isobutyl alcohol under the influence of sulfuric acid. A. P. Mrazhkovskiy, M. I. Natush.

and A. D. Petrov (Acad. Sci. U.S.S.R., Moscow). *Izv. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1950, 283-5. Refluxing 1.2 l. iso-BuOH with 1.2 l. 65% H<sub>2</sub>SO<sub>4</sub> 6-8 hrs. and sepg., washing, and drying the org. layer, gave 75-80% di- and triisobutylenes, with some 20% diisobutylenes. The gaseous products consisted of isobutylene 40, 2-butene 12, and acid. hydrocarbons 48%. The dimer fraction yielded some 0.1 g. material corresponding to 2,2,3-trimethyl-3-pentene (I), which on further distn. was sepd into 35% fairly pure 2,2,4-trimethyl-4-pentene (II), b. 101.6°, d<sub>4</sub> 0.7044, n<sub>D</sub> 1.3888, and 63% I, b. 101-103°, d<sub>4</sub> 0.7123, n<sub>D</sub> 1.4012; confirmation was had by Raman spectra of the compds. and of their hydrogenation products (cf. Bazhulin, *et al.*, C.A. 38, 14279). The entire octene fraction on this basis was given the compn.: 75% II, 15% I, and 10% 2,3,4-trimethyl analog. The triisobutylene obtained was identical with that obtained from isobutylene at 0°; it b. 170.9°, d<sub>4</sub> 0.7604, n<sub>D</sub> 1.4326, and on hydrogenation gave the satd. hydrocarbon, b. 172.1-181°, d<sub>4</sub> 0.7487, n<sub>D</sub> 1.4226, identified by the Raman spectrum as 2,2,4,6,6-pentamethylheptane, in accord with Whitmore's ozonization studies (C.A. 35, 6564). Oxidation by dichromate mixt. gave the Butlerov acid [J. Russ. Phys.-Chem. Soc. 5, 187 (1873); 11, 197(1879)], m. 65-7° (really an acid mixt.), yielding the Me ester mixt., b. 217-20°, d<sub>4</sub> 0.8988, n<sub>D</sub> 1.4408; the free acid gave a dimeric mol. wt. in CCl<sub>4</sub>. The oxidation products are identical with those from triisobutylene made from isobutylene at 0°. G. M. Kosolapoff

2

CA

Optical investigation of the nature of the amphoterism of compounds with a hydroxyl group. M. I. Buzay (Acad. Sci. U.S.S.R., Moscow). *Izvest. Akad. Nauk S.S.S.R., Khim. Nauk* 1985, 408-7. The 2 extreme forms of hydroxyl, the ion  $\text{OH}^-$  and the radical  $\text{OH}$ , are characterized, resp., by the vibration frequencies  $\nu = 4550$  and  $3400 \text{ cm}^{-1}$ , the bond energies  $E = 145$  and  $120 \text{ kcal/mole}$ , and the internuclear distances  $r = 0.908$  and  $0.971 \text{ \AA}$ . In gaseous mole., the OH groups have constant internuclear distances between their extreme limits; thus, in gaseous  $\text{H}_2\text{O}$  (essentially basic OH group),  $\nu = 3650$ ,  $E = 110$ , and  $r = 0.965$ , and in  $\text{HCO}_2\text{H}$  (acid OH group)  $\nu = 3600$ ,  $E = 108$ , and  $r = 0.964$ . In the liquid state, owing to intermol. interaction, the values are not sharp, but extend over the range of a band. Thus,  $\nu$ ,  $E$ , and  $r$  for the monomeric  $\text{AcOH}$  are, resp.,  $3570$ ,  $105$ , and  $0.954$ ; in the liquid state, these magnitudes cover the ranges  $3700\text{--}3600$ ,  $60\text{--}108$ , and  $1.000\text{--}0.954$ . In liquid  $\text{HCO}_2\text{H}$  (chain polymer),  $\nu = 3700\text{--}3600$  (max.  $3100$ ),  $E = 60\text{--}108$  (max.  $95$ ),  $r = 1.105\text{--}0.954$  (max.  $1.019$ ); for the hydrated  $\text{OH}^-$  ion,  $\nu = 3600\text{--}3500$  (max.  $3000$ ),  $E = 110\text{--}145$  (max.  $127$ ),  $r = 0.955\text{--}0.908$  (max.  $0.925$ ). In liquid  $\text{H}_2\text{O}$ ,  $\nu$  has its main max. (formed the carrier frequency) at  $3400 \text{ cm}^{-1}$ , side maxima at  $\sim 4100$  and  $2800 \text{ cm}^{-1}$ , and a very weak side band of  $3600 \text{ cm}^{-1}$ . These side maxima extend, resp., into the ranges characteristic of acid and of basic properties, whereas the carrier frequency lies at the boundary of acid and of base character. Similarly, in liquid aca., the carrier frequency of  $3300 \text{ cm}^{-1}$  is accompanied, on both sides, by side frequencies extending into the acid and the basic regions. These phenomena are interpreted by a frequency-modulation interaction between the high-frequency  $\nu$  of the OH group, and the low-frequency ( $0\text{--}300 \text{ cm}^{-1}$ ) vibrations of the intermol. hydrogen bond. This results in a spectrum

of the vibration frequencies of the OH group, of the form  $\nu_s = \nu_0 + s\nu$ , where  $\nu_0$  = the carrier frequency, and  $s = 1, 2, 3, \dots$ . Depending on whether the side frequencies  $\nu_s$  lie on the acid or on the basic side of  $\nu_0$ , the OH in the given compd. is more markedly acid or basic. In the case where the side frequencies lie on both sides of  $\nu_0$ , the OH group in the given compd. is amphoteric. Amphoterism is thus linked with frequency modulation of vibrations. N. T.



CA

3

frequency modulation and predissociation theories of the hydrogen bond. M. I. Baturin. *Izv. Akad. Nauk S.S.S.R., Ser. Fiz.* 14, 429-34 (1970); cf. C.A. 44, 2848i. The predissociation theory of the H bond, which explains the appearing frequencies by a photochem. process, is in contradiction with exptl. results. It favors the frequency modulation theory in which the H bond in ROH...OR<sub>2</sub> of ~8 Cal./mol. modulates the OH bond of 110 Cal./mol. giving rise to a discrete line spectrum in the region 2000-1600 cm<sup>-1</sup>. The classical theory of the H bond should be replaced by a quantum-mech. theory. S. Pakswi.

1957

No. 4

Investigation of the degree of acidity of some alcohols and of phenol by Raman spectra. M. I. Matyura, A. P. Meshcheryakov, and A. D. Matveeva (Acad. Sci. U.S.S.R.). *Zhur. Eksp. Teor. Fiz.* 20, 318-22 (1950).

The frequency of the OH vibration in alcohols decreases systematically with increasing acid character. In 12 vol. % soln. in  $\text{CCl}_4$ , the observed frequencies were:  $\text{Me}_3\text{C}/(\text{Me})_2\text{OH}$  (I) 3615,  $\text{PhOH}$  (II) 3600,  $\text{Cl}_3\text{C}-\text{C}(\text{Me})_2\text{OH}$  (III) 3575  $\text{cm}^{-1}$ . By its chem. behavior, I, a typical tert. alc., is predominantly basic, in particular, with  $\text{HCl}$ , it exchanges readily OH for Cl. In II, the acid character is more outspoken, in particular the ease of formation of phenolates, and the difficulty of esterification. The strongest acid is III, which forms alkoxides readily, is not esterified by  $\text{HCl}$ , and is not dehydrated on heating in the presence of iodine. The results confirm that increased acid character of the OH group lowers its vibration frequency.

N. Thon

BATUYEV, M. I.

"Hydrocarbons of the Cyclopentane Series with a Double Bond in the Side-Chain. II. Vinylcyclopentane," by A. F. Plate, P. N. Shafran, and M. I. Batuyev (J. Gen Chem. USSR, 1950, 20, 472-279 - US Translation 505-511)

Dehydrating the acetate of 1- or 2-cyclopentylethanol by pyrolysis furnishes vinylcyclopentane, the structure of which is established by its chemical behaviour and by the frequencies of the combined light-scattering spectrum which are listed. Mg cyclopentyl chloride (I) and MeCHO furnish 1-cyclopentylethanol,  $C_7H_{14}O$  (33%), b.p.  $73-76^\circ/32 - 30$  mm.,  $d_4^{20}$  0.9228,  $n_D^{20}$  1.4560, which yields its acetate,  $C_9H_{16}O_2$  (84%), b.p.  $76-79^\circ/24$  mm.,  $179-185^\circ/746$  mm.,  $d_4^{20}$  0.9408,  $n_D^{20}$  1.4561, when mixed with  $Ac_2O$  and gradually treated with  $H_3PO_4$  (d 1-7)- $Ac_2O$  (prepared overnight) at  $738^\circ$ . Ethylene oxide and I furnish 2-cyclopentylethanol,  $C_7H_{14}O$  (27%), b.p.  $94-96^\circ/24$  mm.,  $d_4^{20}$  0.9190,  $n_D^{20}$  1.4576, similarly transformed into the acetate,  $C_9H_{16}O_2$ , b.p.  $98-100^\circ/34-35$  mm.,  $193-195^\circ/742$  mm.,  $d_4^{20}$  0.9541,  $n_D^{20}$  1.4399. Pyrolysis of the acetates by passage in a slow stream of  $N_2$  over glass wool contained in a Mo glass tube heated to  $500^\circ$  gives vinylcyclopentane,  $C_7H_{12}$  (II) (>80%), b.p.  $98-2 - 98-5^\circ/750$  mm.,  $d_4^{20}$  0.7667,  $n_D^{20}$  1.4191. Oxidation of II with cold 1%  $KMnO_4$  gives  $H_2CO_3H$  and cyclopentanecarboxylic acid, b.p.  $215-220^\circ$ ,  $d_4^{20}$  1.0597,  $n_D^{20}$  1.4545; neutral products are not obtained.

H. Wren

BATUYEV, M. I.

IA 159796

USSR/Physics - Combination Scattering Apr 50  
Chemistry - Organic Compounds

"Study of the Degree of Oxidation of Certain Alcohols and Phenols by the Method of Combination Scattering of Light," M. I. Batuyev, A. P. Meshcheryakov, A. D. Matveyeva, Inst of Org Chem, Acad Sci USSR, 5 pp

"Zhur Eksper i Teoret Fiz" Vol XX, No 4

Shows by subject method that increase in degree of oxidation of OH group in a series of alcohols (pentamethyl ethanol, phenol, trichlorodimethyl ethanol) is in complete agreement with chemical data. Submitted 8 Jan 50.

159796

CA

Vibrations of the hydrogen bond and its importance in  
the region of low (Rayleigh's wings) and high frequencies.  
M. I. Baturin (Acad. Sci. U.S.S.R., Moscow). *Zhur.*  
*Fiz. Khim.* 24, 381-4 (1950); cf. *C.A.* 44, 2849s.—Reply  
to Gross and Val'kov, *C.A.* 44, 937b. . . . J. J. H.

BATUYEV, M. I.

N. S. BATUYEV, I. N., BATUYEV, M. I.

BORISOV, A. Ya.

Raman Effect

Raman spectrum of chlorovinyl derivatives of mercury and antimony, Uch. zap. Mosk. un.,  
No. 132, 1950.

Monthly List of Russian Accessions Library of Congress October 1952, Unclassified

Optical study of the nature of the hydroxyl group in primary, secondary, and tertiary alcohols. M. I. Batury and A. D. Matveeva. *Izv. Akad. Nauk SSSR Khim.* 1951, 418-50; cf. C.A. 44, 2646. - Examined the vibration frequencies associated with the OH group in the three classes of alcs. and consideration of their behavior reveals some erroneous conceptions about the alcs, specifically the usual regard for acidic and basic properties of the alcs, without regard for the tendency of the OH group to behave as a radical. From the data on Raman spectra of the alcs, it is readily seen that the tendency to form radicals of the OH group of the alcs, steadily rises in passing from primary to secondary and tertiary forms. The same concept can be extended to alkyl halides and mercaptans. 11 references to collections of data on spectra and thermodynamic consts. of OH compds. are cited. The characteristic line for all primary alcs. lies at  $3632\text{ cm}^{-1}$ , for secondary alcs.  $3622\text{ cm}^{-1}$ , and for tertiary alcs. at  $3615\text{ cm}^{-1}$ . G. M. Kosolapoff

BATUYEV, M. I.

USSR/Chemistry - Isomerization

Sep/Oct 51

"Mechanism of Isomerization of Hydrocarbons of the Olefin Series," A. D. Petrov, M. A. Cheltsova, M. I. Batuyev, Inst of Org Chem, Acad Sci USSR

"Is Ak Nauk SSSR, Otdel Khim Nauk" No 5, pp 571-575

Expts on isomerization of hexene-3, 4-methylpentene-1 (I), 2-methylpentene-2 (II), and hydroisomerization of 2-ethylhexene proved that isomerization of normal and branched hexenes and octenes, with formation of 1 or 2 side chains, results from 2 parallel, independent reactions. Found that II cannot be isomerized to form 2 side chains, while I gives good yield of 2,3-dimethylbutene-1.

PA 195T16



BATUYEV, M. I.

USSR/Chemistry - Synthetic Fuels

Nov/Dec 51

"Catalytic Hydrocondensation of Carbon Monoxide With Olefins. VI. Hydrocondensation of Carbon Monoxide with n-Butene," Ya. T. Rydus, M. I. Krahov, M. I. Batuyev, N. D. Zelinskiy, Inst Org Chem, Acad Sci USSR

"I. Ak Nauk SSSR, Otdel Khim Nauk" No 6, pp 722-727

Continuing investigation of reaction discovered by them in 1946, authors studied hydrocondensation of CO with n-butene at 190° and 1 atm in the presence of 4-6% CO and equimolar quantities of n-butene and H<sub>2</sub>. Yield of liquid condensate amounts to 635 ml/m<sup>3</sup> (or 52 ml/l per hr. 9% of n-butene react) 30-37% under formation of octene). The liquid condensate freed from gasol (C<sub>4</sub>) boils in the range 28-276°. It consists of paraffin hydrocarbons and 28% unsatd compds. On hydrogenation 77.5% of the liquid condensate distills between 28-152°. The compn then is 24 vol-% C<sub>5</sub> (half of it isopentane), 15% C<sub>6</sub>, 8% C<sub>8</sub>, 9% C<sub>9</sub>.

PA 19777

BATUYEV, M. I.

USSR/Chemistry - Petroleum, Isomerisation

Nov/Dec 51

Isomerisations of Olefinic Hydrocarbons Over Aluminosilicates," A. A. Petrov, A. V. Frost, M. I. Batuyev, Petroleum Inst, Acad Sci (USSR

"Is Ak Nauk SSSR, Otdel Khim Nauk" No 6, pp 745-752

Investigated catalytic isomerisation on aluminosilicate catalyst of a number of olefinic hydrocarbons under conditions excluding cracking. Proposes mechanism of isomerisation involving splitting off of olefin from catalyst under formation of intermediate alkyl cyclopropane product. These cyclopropane derivs then undergo ring opening through fission of the most highly strained bond. In the unsatd products, the double bond is usually next to the side alkyl group.

PA 197T10

USSR/Chemistry - Hydrogen Bond

Jul 51

"Hydrogen Bond and the Physical Idealism of Its  
Predissociation Theory," M. I. Batuyev

"Zhur Fiz Khim" Vol XIV, No 7, pp 884-895

Criticizes the predissociation theory of the hydro-  
gen bond, referring to it as harmful and as a typ-  
ical example of the formalistic tendency in physics.  
Denies that spectroscopic and other exptl data  
prove predissocn and discusses this point at length.  
Disagrees in polemic with M. V. Vol'kenshteyn, M. A.  
Kl'yashevich, and B. I. Stepanov, authors of mono-  
graph "Oscillations of Molecules," GITTL (State

206729

USSR/Chemistry - Hydrogen Bond (Contd)

Jul 51

Publ House of Technical-Theoretical Lit), 1949, and  
with Ye. F. Gross, V. M. Chlanskily, et. al., whose  
work on the hydrogen bond is based on predissocn  
theory.

206729

BATUYEV, M. I.

BATUYEV, M. I.

LC

190724

USSR/Chemistry - Resonance (Contd)

Aug 51

Refers to the predissociation theory of the hydrogen bond (M. V. Vol'kenshteyn, M. A. El'yasevich, B. I. Stepanov) as one of these theories.

LC

190724

Criticizes in great detail M. D. Sokolov's theory (Dokl Ak Nauk SSSR Vol LVIII, 611, 1947; Vol LX, 825, 1948), which postulates very strong forces of attraction compensated by strong forces of repulsion. Says that the whole construction is fictitious, because the forces in question cannot be observed, and adds that theories which are not based on facts are contrary to Marxism-Leninism.

PI 190724

"Zhur Fiz Khim" Vol XIV, No 8, pp. 995-1000  
"Physical Idealism of the Resonance Theory of the Hydrogen Bond," M. I. Batuyev, Moscow

USSR/Chemistry - Resonance

Aug 51

CA

2

6) Detailed criticism of the resonance theory of the hydrogen bond. M. I. Buzan, *Ukr. Khim. Zh.*, 28, 984-1000 (1981). The theory of the H bond of Salter (Dobrykh *Ukr. Khim. Zh.*, 615 (1967); *C.A.*, 62, 8668) is criticized. Salter assumes that the repulsive energy at the distance actually observed in H bonds is of the order of 60 kcal. This repulsive energy is more than compensated by exchange forces which he takes, with the use of resonance theory. The repulsive energy, however, is calculated on the assumption that H in the H bond keeps its normal van der Waals radius. This is an unwarranted assumption. Consequently, all the rest of Salter's theory is fictitious. Moreover, it violates the fundamental tenets of Mariani-Louis.

Michel Boudart

EYDUS, Ya.T.; PUZITEKIY, K.V.; BATUYEV, M.I.

Catalytic hydrocondensation of carbon monoxide with olefins. VIII. Hydro-  
condensation of carbon monoxide with isobutylene. Izvest. Akad. Nauk S.S.S.R.  
Otdel Khim. Nauk '52, 978-81. (MIRA 5:11)  
(CA 47 no.21:11122 '53)

1. Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow.

USSR/Chemistry - Resonance-Mesomeric Theory

Theory

. ov 52

Heitler's and London's Theory of the Chemical Bond as a Basis for the Resonance-Mesomeric Theory and the Defectiveness of this Basis," M. I. Batyev, Moscow

"Zhur Fiz Khim" Vol 26, No 11, pp 1694-1710

The author does not agree with the view of others, to wit, that the resonance-mesomeric theory does not evolve from the quantum mechanism. He sees this theory as an attempt to qualitatively transfer Heitler's and London's chem bond theory, regarding the simple H mol, to the more complex mols. Since, to the author, this chem bond theory is the very foundation of the resonance-mesomeric theory, and is defective, then, ipso facto, the resonance-mesomeric theory is also defective. Batyev condemns the theory of Heitler, London, Pauling and others for destroying the conception of the "individual" mol established by the principles of Lomonosov and Butlerov. In affirming the individual chem structure of the mol, the author finds the chem theory of Heitler and London invalid; consequently, the resonance-mesomeric theory is insupportable.

242718

SHOSTAKOVSKIY, M. F. - BATUEV, M. I. - TIUPAEV, P. V. - MATVEYEVA, A. D.

Oxonium

Oxonium theory and its optical substantiation on simple vinyl ethers.  
Dokl. AN SSSR 89 no. 1, 1953

9. Monthly List of Russian Accessions, Library of Congress, May 1953. Unclassified.



BATUYEV, M.I.

Chemical Abst.  
Vol. 48  
Apr. 10, 1954  
Organic Chemistry

Optical study of the hydrogen bond in some monovinyl ethers of glycols and polyglycols. M. I. Batuyev, P. V. Turyayev, and A. D. Malyshev. Doklady Akad. Nauk S.S.S.R. 89, 411 (1953). The Raman spectra of monovinyl ethers of glycol,  $\text{CH}_2\text{CH}_2\text{OH}$ ,  $\text{OCH}_2\text{CH}_2\text{OH}$ , and  $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{OH}$ , show a long-wave displacement of the OH frequency with typical unearring of the band at  $1200-1300 \text{ cm}^{-1}$ . Cryoconcentrations also show increasing with increased content of the ethers in  $\text{C}_2\text{H}_5$ , the homeric cyclic acetals of glycol,  $\text{CH}_2(\text{CH}_2\text{OH})_2$ , and  $(\text{CH}_2\text{CH}_2\text{OH})_3$ , which cannot form H bonds also show lower b.p.s. and lower viscosities than are shown by their isomers: vinyl glycol ethers. The latter show isomerization into the acetals in solns. In  $\text{CCl}_4$  this does not occur in  $\text{C}_2\text{H}_5$ . G. M. Kosolapoff

BATUYEV, M. I.

Determination of individual hydrocarbon composition of gasolines by the combined method. II. Two gasolines from petroleum of Kazanbulak origin. B. A. Kazanbulak, A. F. Plate, E. A. Mikhailova, A. A. Izrael, M. I. Batuev, T. F. Bulanova, and G. A. Tarasova (N. D. Zelinskii Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow). *Izv. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1954, 260-77; cf. *C.A.* 48, 7342a. Two specimens of gasoline from Kazanbulak area were examined, by the combined optical-distn. method. In fractions b. under 160° over 70 hydrocarbons were identified, thus accounting for 40-55% of the total compn. It is shown that despite the close origin of the specimens geographically, considerable differences in compn. are found. III. Surakhan gasolines. B. A. Kazanbulak, G. S. Landsberg, A. F. Plate, A. L. Liberman, E. A. Mikhailova, P. A. Izrael, M. I. Batuev, S. A. Ukhov, T. F. Bulanova, and G. A. Tarasova. *Ibid.* 278-91. Two specimens of Surakhan gasolines were examined, by the combined method. In both some 47 hydrocarbons were identified, accounting for 77-84% of the total compn. Distn. curves and distn. data are cited.

G. M. Kosolapoff

KAZANSKIY, B.A.; LANDSBERG, G.S.; PLATE, A.F.; LIBERMAN, A.L.; MIKHAYLO-  
VA, Ye.A.; BAZHULIN, P.A.; BATUYEV, M.I.; UKHOLIN, S.A.; BULANOVA, T.F.;  
TARASOVA, G.A.

Composite method for the determination of individual hydrocar-  
bons in gasolines. Part 3. The Surakhany gasolines. Izv.AN SSSR.  
Otd.khim.nauk no.2:278-291 Mr-Ap '54.

(MLRA 7:6)

1. Institut organicheskoy khimii im. N.D.Zelinskogo, Fizicheskiy  
institut im. P.N.Lebedeva Akademii nauk SSSR.  
(Hydrocarbons) (Surakhany--Petroleum) (Petroleum--Surakhany)



SATO, V. M. I.

Chemical structure of acetals. M. P. Shostakovskii, I. I. Batyagin, V. I. Belovskiy, and A. D. Matveeva (Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow). Doklady Akad. Nauk S.S.S.R. 94, 261-4 (1954).—In view of the known reactions of acetals (elimination of phenols on heating of aromatic-aliphatic acetals, disproportionation on heating of aliphatic acetals, alcoholic reactions of aliphatic acetals) it was felt that their structure might involve tautomerism with structures like  $\text{CH}_2\text{:CHOR...HOR}$ . The following acetals were prepd. for a test of this hypothesis; the following theses were run by the reaction of  $\text{CH}_2\text{:CHOPh}$  with  $\text{MeCOH}$  or of malonal with  $\text{CH}_2\text{:CHOCHMe}$  in the presence of a trace of  $\text{HCl}$ :  $\text{MeCH(OCHMe)_2OPh}$ , b.  $83-4^\circ$ ,  $d_4$  0.9363,  $n_D^{20}$  1.4830;  $\text{MeCH(OCHMe)_2OC_2H_5OMe}$ , b.  $111-12^\circ$ ,  $d_4$  1.0132,  $n_D^{20}$  1.4830. The intermediate  $\text{CH}_2\text{:CHOCHMe}$ , b.  $75-5.2^\circ$ ,  $d_4$  0.7855,  $n_D^{20}$  1.3941. Raman spectra of the above acetals show many lines which exceed the sum of the lines caused by the phenol component as such and  $\text{MeCOH}$  as such; in all instances the frequencies of these components are always present. This is believed to support the tautomerism suggested above. The double-band line of  $\text{CH}_2\text{:CHOCHMe}$  at  $1637\text{ cm}^{-1}$  is weaker in the acetal than in the vinyl ether, as may be expected from the concept of conjugation.

Chemical and physical properties of the hydroxyl group in dimethylsilane. M. I. Batuyev, M. P. Shostakovskii, V. I. Ushakov, A. D. Matrova, and S. V. Dubrovina (N.D. Zhurn. Khim. i Mekh. Zhidk., 1984, No. 1, p. 1387).  
 Dzhurn. Khim. i Mekh. Zhidk., 1984, No. 1, p. 1387.  
 m. -4.6°,  $\rho_{20} = 0.8083$ ,  $n_D^{20} = 1.3871$ ,  $d_4^{20} = 0.8149$ ,  $d_4^{25} = 0.8084$ , maintaining its H-bond formation ability in solution, as shown by cryoscopic data; in CCl<sub>4</sub> it forms associates, complexes with a rapid rise of apparent mol. wt. with the concentration in the pure liquid more complex structures can be postulated. In the liquid state the hydrogen spectrum is broadened. However, the H-bond structure is not destroyed by bonding. Moreover, the H-bond structure is not destroyed by the C-analog. Me<sub>2</sub>SiOH reacts more vigorously with Na and K at 0-3° than does the carbino. Me<sub>2</sub>SiOH also forms a ppt. of Me<sub>2</sub>SiONa with concd. NaOH. With traces of acid catalyst Me<sub>2</sub>SiOH adds to vinyl ethers, forming acetals (cf. Shostakovskii, et al., C.A. 49, 1642a). However, Me<sub>2</sub>SiOH also displays basic properties of the HO group, particularly shown by the Ramand lines 3632 and 3702 cm<sup>-1</sup> in CCl<sub>4</sub>, the characteristic HO band vanishes and only the 3702 line remains; this must be due to the vibration of the unassociated HO group. It is shifted in respect to that of C-analog because of the effect of the HO group.

USSR.

BATUYEV, M.I.

BATUYEV, M-I.

Physical and chemical properties of silicohydrocarbons (silanes), 1,2-disilanes, dimers, polydimethyls and hexamethyls. M. I. Butner, V. A. Ponomareva, A. D. Matveeva, and A. D. Petrov. *Dokl. Akad. Nauk S.S.S.R.* 193, 806-81 (1954). Reduction of  $\text{SiO}_2$  by  $\text{CH}_3\text{SiH}_3$  at  $161.4^\circ\text{C}$ . gave 1.468, with 37.4%  $\text{H}_2$  in the gas.  $\text{CH}_3\text{SiH}_3$  and  $\text{SiH}_4$  were reduced by  $\text{LiH}$  in  $\text{Et}_2\text{O}$ - $\text{AlEt}_3$  at  $116.8^\circ\text{C}$ . gave 1.524, with 15.4%  $\text{H}_2$ .  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_3$  was reduced by  $\text{LiH}$  in  $\text{Et}_2\text{O}$ - $\text{AlEt}_3$  at  $111.6^\circ\text{C}$ . gave 1.685, with 15.8%  $\text{H}_2$ . The material did not traffic on contact with  $\text{C}_2\text{H}_5\text{MgBr}$ . *cf.* English, *et al.*, *ibid.* 47, 929 (1953). Raman spectrum,  $\text{cm}^{-1}$ : 173 (1), 1969 (10), 2691 (1), 767 (8), 853 (1), 948 (10), 1063 (1), 1500 (3), 2161 (3), 2368 (9), 264 (12). The product obtained by similar reduction of  $\text{C}_4\text{H}_9\text{SiH}_3$  was similar to the above. Previously reported active, white, crystalline (*cf.* *ibid.* 48, 690 (6)).  $\text{CH}_3\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_2\text{SiH}_3$  was reduced similarly (*cf.* *ibid.* 48, 690 (6)). Raman spectrum,  $\text{cm}^{-1}$ : 172 (1), 1967 (8), 2690 (8), 764 (8), 853 (1), 948 (9), 1063 (9), 1500 (3), 2161 (3), 2368 (10), 264 (12).  $\text{C}_2\text{H}_5\text{$

SHOSTAKOVSKIY, M. P.; BATUYEV, M. I.; CHEKULAYEVA, I. A.; MATVEYEVA, A. D.

Optical study of certain ethanolamine vinyl ethers. Izv. AN  
SSSR. Otd. khim. nauk no. 3: 544-550 My-Je '55. (MLRA 8:9)

1. Institut organicheskoy khimii imeni N. D. Zelinskogo Akademii  
nauk SSSR.

(Vinyl ethers) (Ethanol)



BATUYEV, M.I.

V Optical study of some vinyl ethers of ethanolamines. M. I. Batuyev, F. Shostakovskii, M. I. Batuyev, I. A. Chukuleva, and A. D. Matveeva (N. D. Zelinski Inst., Org. Chem., Acad. Sci. U.S.S.R., Moscow). *Izv. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk*, 1955, 431-6 (Engl. translation); 544-50; cf. C.A. 49, 7888b. The previously reported vinyl ethers of ethanolamine and its analogs display the Raman characteristics of intramol. H bonds; the chem. inertness of some compds. in this group is ascribed to H bonding. The region of diffuse Raman lines at 3150-3400 cm.<sup>-1</sup> includes the O—H—O, as well as N—H—O bonds. The following Raman spectra are reported: CH<sub>3</sub>CHOCH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>, 169(2), 248(4b), 285(0), 324(2), 332(2), 404(1), 435(1), 495(4), 603(3), 644(0), 710(2), 821(5b), 904(4), 950(4), 1084(2), 1099(3), 1113(3), 1157(1), 1179(2), 1259(3), 1251(10), 1354(2), 1407(2), 1431(5), 1617(8), 1637(7), 2711(7), 2932(8b), 3018(3), 3217(0), 3263(1), 3293(1), 3324(5b), 3335(3b); (CH<sub>3</sub>CHOCH<sub>2</sub>CH<sub>2</sub>NH)<sub>2</sub>, 171(2), 241(4b), 309(3), 309(3), 600(0), 745(0), 778(0), 826(5b), 862(3), 935(0), 972(3), 1001(2), 1032(3), 1087(2), 1102(3), 1149(3), 1203(3), 1233(3), 1322(10), 1354(0), 1399(1), 1418(2), 1468(3), 1617(8), 1642(7), 2842(3), 2876(7), 2932(5b), 3023(4).

3225(0), 3271(1), 3338(4b), CH<sub>3</sub>CHOCH<sub>2</sub>CH<sub>2</sub>NHCH<sub>2</sub>CHMeCO<sub>2</sub>Me, 163(1), 183(1), 236(3b), 324(1), 336(1), 431(0), 458(0), 505(1b), 611(5b), 658(5b), 708(1), 765(1), 818(1), 838(5b), 903(2b), 935(0), 973(3), 991(3), 1029(0), 1035(0), 1104(1), 1152(1b), 1206(1b), 1331(10), 1368(1), 1419(1), 1453(8), 1619(6), 1637(5), 1660(2), 1668(1), 1737(4), 2380(6), 2943(10b), 2972(3), 3020(2), 3032(0), 3179(1), 3224(1), 3274(1), 3343(4b); PhNHCH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>3</sub>, 125(2), 178(1), 214(2), 233(2), 248(2), 414(4b), 490(1), 510(1), 531(1), 576(0), 596(1), 619(4), 645(0), 663(0), 752(4), 782(4), 815(5), 833(0), 832(5), 871(0), 916(1), 939(10), 1029(6), 1073(0), 1155(4), 1182(3), 1199(0), 1237(1), 1320(5), 1356(0), 1380(0), 1408(0), 1434(0), 1455(1), 1493(1), 1603(10), 1619(1), 1689(1), 2650(0), 2876(4), 2933(4), 2984(0), 3024(1), 3301(1), 3351(1), 3406(4b), HOCH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>, 171(1), 482(4), 322(2), 335(4), 374(5), 1034(3), 1065(4), 1083(5), 1106(4), 1172(2b), 1248(3b), 1298(5), 1313(5), 1359(4b), 1400(10), 1593(1b), 2707(3b), 2862(10), 2914(2), 2942(0), 3145(1), 3187(3), 3239(2), 3300(5b), 3364(3b), 3150-3400 (HO band).

G. M. Kozlovskii

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BATUYEV, M-I

Synthesis of ~~tert-butyl~~ hydroperoxide and ~~tert-butyl~~  
peroxide and their ~~radical~~ study in light of the ~~radical~~ theory of  
structures of hydrogen peroxide. A. P. Marchenko,  
D. S. K. R. D. Chem. 1955, 661-6 (Engl. translation).  
Ser. C. 4, 50, 1955.  
B. M. R.

REW

24

BATUYEV, M. I.

USSR / Physical Chemistry. Molecules. Chemical Bond

B-4

Abs Jour : Ref Zhur - Khimiya, No 8, 1957, 25790

Author : A.P. Meshcheryakov, M.I. Batuyev, A.D. Matveyeva.

Inst : Academy of Sciences of USSR

Title : Synthesis of Tertiary Butyl-Hydroperoxide and Ditertiary Butyl Peroxide and Their Optical Study in Light of Question of Hydrogen Peroxide Structure,

Orig Pub : Izv. AN SSSR, Otd. khim. n., 1955, No 4, 742-749

Abstract : Tertiary butyl hydroperoxide (I) and ditertiary butyl hydroperoxide (II) were prepared by alkylation of 1 mol of 27%  $H_2O_2$  with 2 mols of monotertiary butyl sulfuric acid (III) at 0 to 10° in the duration of 4 to 5 hours; the yield was 80%. II is separated from I by the treatment with a 10 to 20% NaOH solution at 0 to 10°. III is prepared by the absorption of isobutylene by the 63%  $H_2SO_4$  at 0 to 20°. Spectra of combined scattering of I and II are

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*BATUYEV, M. I.*

USSR/ Chemistry - Organic chemistry

Card 1/2 Pub. 22 - 19/52

Authors : Batuyev, M. I., and Antsus, L. I.

Title : ~~Optical investigation of the chemical structure of A. M. Butlerovs'~~  
oxoktenol

Periodical : Dok. AN SSSR 100/2, 267-270, Jan 11, 1955

Abstract : Various opinions are presented regarding the chemical structure of A. M. Butlerovs' oxoktenol ( $C_8H_{10}O_2$ ). Since the oxoktenol spectrum shows an intensive frequency of  $1662\text{ cm}^{-1}$  it indicates beyond doubt that this molecule has a carbonyl group. The oxoktenol properties which are demonstrated by extreme chemical inertia of the carbonyl group are explained by the strong affinity of the carbonyl group in its five-membered ring.

Institution : Acad. of Sc. USSR, The N. D. Zelinskiy Institute of Organic Chemistry

Presented by : Academician B. A. Arbuzov, June 22, 1954

Periodical : Dok. AN SSSR 100/2, 267-270, Jan 11, 1955

Card 2/2 Pub. 22 - 19/52

Abstract : The carbonyl group, in conditions warranting the severance of the hydrogen bond of the five-membered oxoketenol ring, was found to be highly reactive. Twelve references: 10 USSR and 2 German (1883-1953).

BATUYEV, M.I.

Optical study of the silicon surface under electron

electronization, i.e. the state of surface and structure

are reported:  $10^4$ SiH, 120(2), 170(2), 300(4), 300(2),  
327(2), 405(0), 584(10), 642(3), 675(3), 700(4), 722(8),  
740(6), 870(2), 1021(8), 1120(8), 1310(7), 1450(8), 1470(8).

Institut gosyuchitel' tekhnicheskoy fiziki  
Akademicheskaya ulitsa 5556

BATOYEY, ~~AD~~ T. T.  
M.I.

Optical study of tetraethylsilanes, ethylchlorosilanes, and the regularity of chlorination of these compounds. L. I. Bataev, A. D. Petrov, V. A. Ponomarenko, and A. D. Matveeva. *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1956, 1070-8. — The following Raman spectra (cm.<sup>-1</sup>) were detd.:  $\text{Et}_4\text{Si}$  170(3), 233(0), 284(2), 299(5), 332(1), 392(1), 349(10), 554(4), 636(3), 699(0), 713(1), 731(5), 744(4), 974(6), 1007(4), 1022(5), 1234(8), 1278(0), 1297(0), 1331(0), 1379(1), 1418(5), 1465(8), 2734(2), 2821(3), 2879(10), 2903(0), 2940(4), 2955(5), 2963(0);  $\text{Et}_3\text{SiCl}$ , 168(3), 210(2), 242(1), 281(2), 301(4), 316(4), 325(1), 401(4), 478(0), 502(6), 607(3), 729(3), 743(3), 977(5), 1006(4), 1024(4), 1239(4), 1379(0), 1416(4), 1467(7), 2092(0), 2741(2), 2825(2), 2882(0), 2914(6), 2941(2), 2966(4), 2979(0);  $\text{Et}_2\text{SiCl}_2$ , 117(1), 120(1), 167(1), 185(5), 227(1), 230(2), 251(1), 297(5), 311(5), 330(0), 420(0), 457(10), 473(2), 493(0), 531(2), 548(2), 645(5), 689(2), 706(2), 738(2), 749(2), 976(4), 1009(5), 1024(2), 1056(0), 1227(1), 1243(5), 1248(0), 1293(0), 1318(0), 1409(5), 1433(0), 1463(0), 2741(1), 2825(2), 2885(5), 2919(3), 2934(4), 2967(3), 2983(0);  $\text{EtSiHCl}_2$ , 177(5), 188(5), 226(0), 264(0), 296(4), 403(10), 548(3), 566(3), 666(5), 768(4), 799(5), 813(5), 975(3), 1019(3), 1073(0), 1093(0), 1236(4), 1403(3), 1463(4), 2204(9), 2747(1), 2829(1), 2889(7), 2914(2), 2939(4), 2973(3), 2986(1);  $\text{EtSiCl}_3$ , 120(4), 166(2), 179(0), 193(0), 223(7), 323(7), 447(10), 504(4), 590(4), 777(4), 973(2), 985(2), 1015(4), 1222(1), 1244(4), 1389(3), 1425(2), 1463(0), 2779(1), 2848(1), 2895(7), 2931(2), 2946(6), 2978(3), 2989(0);  $\text{Et}_3\text{C}$ , 174(2), 371(3), 405(10), 457(1), 644(0), 682(7), 776(1), 800(0), 912(7), 1013(0), 1057(2), 1080(8), 1102(0), 1134(3), 1151(4), 1174(1), 1198(4), 1230(4), 1272(0), 1309(1), 1350(3), 1383(3), 1458(10), 2735(2), 2926(2), 2964(3), 2988(10), 2992(6), 2945(1), 2964(4).

Bokun, M.T., D.K., P.D.; Penonave, N.S., U.A.

EtCCl, 177(0), 182(6), 244(5), 271(6), 332(5), 343(3), 408(10), 520(10), 697(4), 778(4), 820(3), 931(2), 1056(4), 1090(1), 1112(1), 1271(2), 1436(4), 1468(4), 1497(0), 1622(0), 2744(1), 2842(1), 2888(3), 2943(10), 3061(2), 3088(5), 3000(0). The following assignments are made

for hydrocarbons: in CH, the 2853 line is due to symmetric vibration and 2908 is due to antisymmetric vibration (degenerate in Me), while in the Me group 2879 is symmetric and 2907 is antisymmetric vibration. The intensity of the symmetric vibration of Me is relatively more intense than that of CH, indicating greater protonization of the CH bond in the CH<sub>3</sub> group. Protonization means the approach or penetration of H into the electron orbital of the bond. Among the silanes the following assignments are made: Me in Et<sub>3</sub>Si, 2879, 2940, 2955, CH in Et<sub>3</sub>Si, 2908, 2968. These frequencies are compared to those in hydrocarbons in the light of lower electronegativity of Si in comparison with C, which leads to a displacement of electrons toward C from the Si atom, but the effect is restricted largely to the 1st CH<sub>3</sub> groups and has little effect on terminal Me groups. The introduction of Cl raises the frequencies of vibration within Me and CH<sub>3</sub> groups. In view of the probable electronic distribution, the results of chlorination of silanes can

be explained. Chlorination of Et<sub>3</sub>Si results in attack on the CH<sub>3</sub> groups owing to greater electron density at these locations; progressive introduction of Cl atoms in place of Et groups results eventually in exclusive attack on the Me groups, owing to the electron-attracting effect of the Cl atoms on Si.

G. M. Kosolovoff

2/2



BATUYEV, M.I.

USSR / Physical Chemistry. Molecule. Chemical Bond.

B-4

Abs Jour : Ref Zhur - Khimiya, No 8, 1957, 25736

Author : M.I. Batuyev

Title : To The Question of Experimental Proof of Baker-Nathan Effect.

Orig Pub : Zh. obshch. khimii, 1956, 26, No 7, 1888-1896

Abstract : Basing on bibliographic data of other authors about characteristic frequencies of molecule vibrations (Trambarulo R., Gordy W., J. Chem. Phys., 1950, 18, 1613), an attempt was made to check the correspondence of the concept of Baker-Nathan effect (hyperconjugation) to actuality. The conclusion is arrived at that the electron mechanism proposed by the hyperconjugation hypothesis has been experimentally disproved and that the electron-nucleus interactions in the molecule are in fact more complicated.

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BATUYEV, M.I.

✓ *Ecological study of factors which contribute to the transmission of*

\* *Journal of the American Medical Association*, 1990; 263: 1009-1012.

light induced by nucleophilic and electrophilic reagents is reported. The C-Cl link in such esters shows abnormally high Raman frequencies.

G. M. Kosolapoff

FM -

BATUYEV, M. I.

The physical basis for the reaction capacity of compounds with a carbonyl group. (M. I. Batuyev, Izvest. Akad. Nauk SSSR, 1956, 1329-41). By comparing the reaction rates of various compounds with a carbonyl group, it was shown that the reaction capacity is determined by the parameters of the carbonyl group, namely, the energy, and interatomic distance, etc. The use of the carbonyl compounds as examples, it was shown that the change in these parameters can be used to predict the factors that determine the reaction capacity of such compounds.

Chem  
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1. Inst. Khimicheskikh Reaktsiy Akad. Nauk SSSR  
(Carbonyls) (Chemical reactions)

*BATUYEV, M.I.*  
USSR/Physical Chemistry - Molecule, Chemical Bond.

B-4

Abs Jour : Referat Zhur - Khimiya, No 1, 1958, 140  
Author : M.I. Batuyev, V.A. Ponomarenko, A.D. Matveyeva, A.D.  
Snegova.  
Inst : Academy of Sciences of USSR  
Title : Cis-Trans-Isomerism of 1,2-Di-(Trichlorsilyl) Ethylene.  
Orig Pub : Izv. AN SSSR, Otd. khim. n., 1956, Noll, 1420-1421  
Abstract : Cis- and trans-isomers of 1,2-di--(trichlorsilyl) ethylene (I) were detected by the spectrum of multiple scattering. The range width ( $43 \text{ cm}^{-1}$ ) between the determined frequencies of double links C C of the cis- and trans-isomers of I, unusual as compared with cis- and trans-isomers of other compounds, was noted.

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BATUYEV, M.I.

Optical study of factors which condition the reaction of  $\beta$ -cleavage of organosilicon  $\beta$ -halides. M. I. Batuyev, A. D. Petrov, V. A. Ponomarenko, and A. D. Matveeva. J. Gen. Chem. U.S.S.R. 28, 2613-22(1956) (English translation).—See C.A. 51, 4979a.

B. M. R.

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4E4

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4E3Q

21114

BATUYEV, M.I.

20-2-26/62

AUTHOR

BATUYEV, M.I.

TITLE

On Conjugation in Butadiene

(K voprosu o sopryazhenii v butadiene. Russian)

PERIODICAL

Doklady Akademii Nauk SSSR, 1957, Vol 115, Nr 2, pp 291 - 294 (U.S.S.R.)

ABSTRACT

It is known that the addition of haloids and hydro-haloid acids to the simplest of  $\pi$ -conjugated systems, i.e. butadiene-1,3, takes place in form of a primary act as well in the positions 1,2 as in 1,4. According to test conditions one of these directions will be dominant. According to the Ingold theory (and others) these double reactivity of divinyl is explained as follows: "Two conjugation factors become effective in these reactions, namely the static (mesomeric) effect and a dynamic (electromeric) effect. The first one manifests itself in the molecule and outside the reaction, the latter in the moment of reaction." Effect of the static conjugation. It is caused by the prevalence of the structures I and II among all I - V and other structures in the divinyl molecule which are discussed in the mentioned theory in connection with the quantum mechanic description of the molecule by the method of localized pairs. In another, fundamentally identical denomination, - it is caused by the prevalence of electron displacements IIa ( $I \leftrightarrow II$ ) in all possible IIa - Va and other shifts. The same is explained by schemata of structure and once more described in other technical terms according to the same theory. In the divinyl molecule the atoms 1,4 in a certain

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20-2-26/62

On Conjugation in Butadiene

different with regard to their chemical structure. They rearrange tautomerically and enter the reaction in its final stage, namely during the addition of the negative ion to divinyl.  
(1 illustration, 19 Slavic references).

ASSOCIATION

Institute for Mineral Fuels

PRESENTED BY

(Institut goryuchikh iskopyayemykh Akademii nauk SSSR)

SUBMITTED

NAZAROV, I.N., member of the Academy, April 25, 1957

AVAILABLE

30.3.1957

Library of Congress

Card 3/3

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000203930011-2

Abs Jour: Referat. Zhurnal Khimii, No 3, 1958, 6979.

Author : M.I. Batuyev, V.A. Ponomarenko, A.D. Matveyeva, A.D. Snegova.

Inst : Academy of Sciences of USSR.

Title : Optical Investigation of Intermolecular Interaction Si...Cl.

Orig Pub: Izv. AN SSSR. Otd. khim. n., 1957, No 4, 515-516.

Abstract: Blurring of lines referred to the valence vibrations C-Cl (722  $\text{cm}^{-1}$ ) and Si-Cl (448  $\text{cm}^{-1}$ ) was observed in the Raman spectrum of the silico-organic  $\beta$ -halide  $\text{Cl}_3\text{SiCH}_2\text{CH}_2\text{Cl}$ . This blurring disappears in cyclohexane solution. Also, it is not observed in compounds of the  $\text{Cl}_3\text{Si-CH}_2\text{CH}_2\text{CH}_2\text{Cl}$ ,  $\text{Cl}_3\text{Si-CH}_2\text{-CH}_2\text{-SiCl}_3$ ,  $\text{Cl}_3\text{Si-CH}_2\text{CH}_2\text{CH}_3$  and other types. This phenomenon is explained by the existence of molecular associations caused by an interaction analogous to the hydrogen bond. An easy ethylene and  $\text{SiCl}_4$  formation is observed just in the case of the  $\beta$ -halide.

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USSR/Physical Chemistry - Molecule, Chemical Bond.

B-4

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 6979.

It is expressed that also the formation of an intermolecular bond of the Si...Cl type in  $\text{Cl}_3\text{Si}-\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$  may be possible. The latter is proved by a moderate blurring of the bands  $\nu(\text{C}-\text{C})$  ( $712 \text{ cm}^{-1}$ ) and  $\nu(\text{Si}-\text{Cl})$  ( $457 \text{ cm}^{-1}$ ).

(Institut goryuchukh iskopayemykh)  
Institute Mineral Fuels AN SSSR

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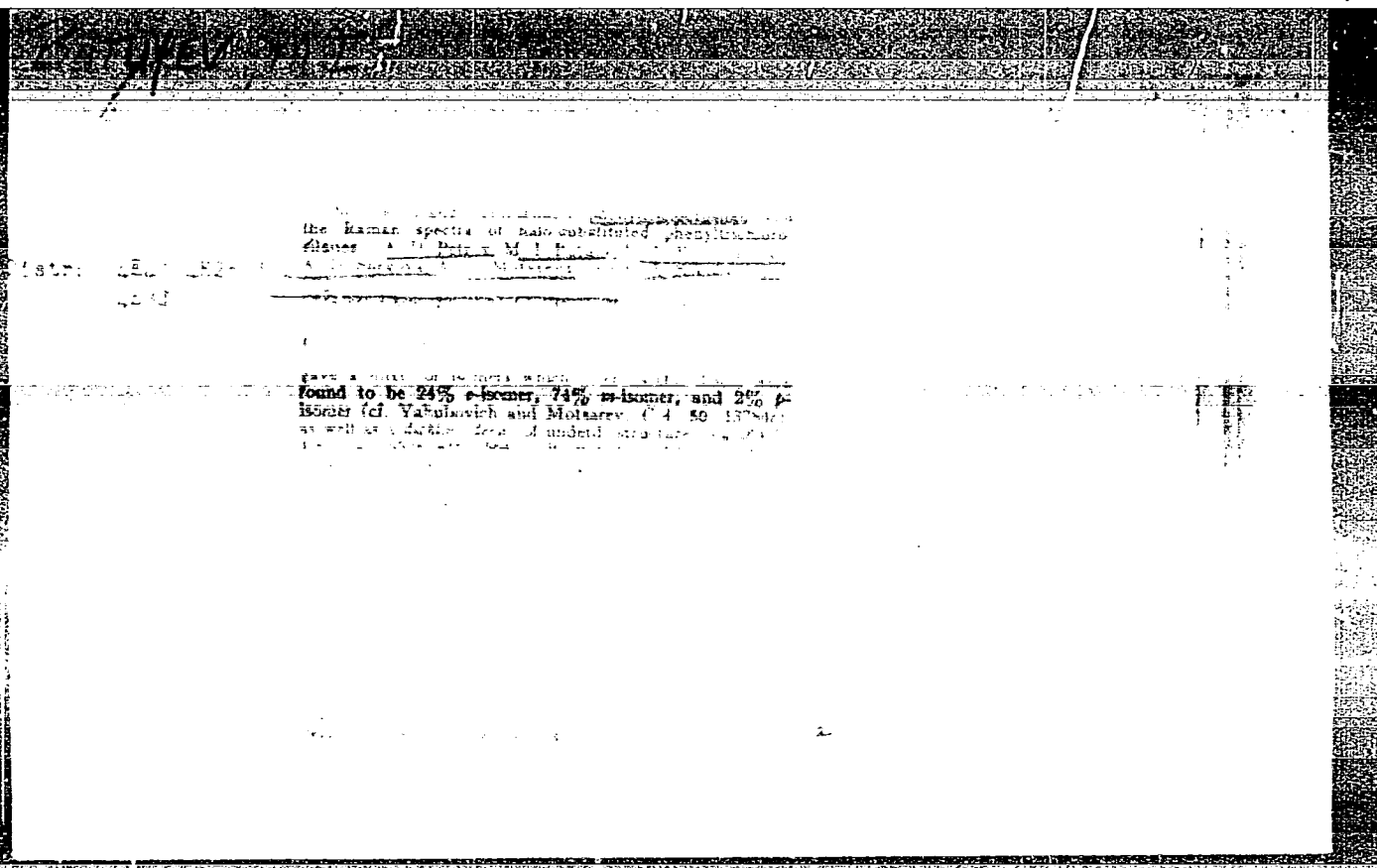
BATUYEV, M. I.

The rule of V. V. Markovnikov relative to addition of halo

acids to unsymmetrically substituted ethylenes. M. I. Batuyev. Zhur. Obshchei Khim. 27, 876-881 (1957). Expt. of the Raman spectrum of propene showed that the C:C bond has a Raman band at 1648  $\text{cm}^{-1}$ , while the C-H vibrations in the Me group are 2924 and 2987 for sym. and antisym. vibrations, resp. These are all higher than the C:C vibration in  $\text{C}_{11}\text{H}_4$  (1621) and C-H vibrations in alkanes (2879 and 2958). Hence direct expt. shows that the C:C bond in propene is shortened rather than lengthened. The result is explained by "electronization" of this double bond and by unequal electron population of the CH bond in the Me, CH, and  $\text{CH}_2$  groups. In propene the CH bond in the 2-position has a frequency of 3002  $\text{cm}^{-1}$  and those in the  $\text{CH}_3$  group have 3015 and 3086  $\text{cm}^{-1}$  frequencies. All are above the paraffinic types. The formation of  $(\text{CH}_3)_2\text{CHCl}$  by addn. of HCl to  $\text{CH}_3\text{CHCH}_2\text{Cl}$  at low temp. is explained by cis-trans isomerism of the latter, with the trans isomer predominating at room temp. or above, yielding the normal Markovnikov-rule product under these conditions. The CH bond frequencies in  $\text{CH}_3\text{CHCH}_2\text{Cl}$  are: cis form, CH in  $\text{CH}_2$  group 2877, 2957, CH in CH group 2989; trans form, 3021, 3030, and 2577, resp. G. M. Kosolapoff

Distr: 4E4j/4E2c(j)

Institut goryuchikh iskopayemykh  
akademii nauk SSSR





БАТУЕВ, М.И.  
BATUYEV, M.I.

On conjugation in butadiene. Dokl. AN SSSR 115 no.2:291-294 J1  
'57. (MIRA 10:12)

1. Institut goryuchikh iskopayemykh AN SSSR. Predstavleno akademikom  
I.N. Nazarovym.

(Butadiene)

*Excerpt 4, 1957*

20-3-18/52

**AUTHORS:** Batuyev, M. I., Akhrem, A. A., Matveyeva, A. D.,  
and Nazarov, I. N., Academician (~~Deceased~~)

**TITLE:** Optical Investigation of Conformations of Cis- and Trans-2-Methyl-1-ethylcyclohexanols (Opticheskoye issledovaniye konformatsiy tsis- i trans-2-metil-1-etiltsiklogeksanolov)

**PERIODICAL:** Doklady AN SSSR, 1957, Vol. 117, Nr 3, pp. 423-426 (USSR)

**ABSTRACT:** 1.) According to recent investigations cyclohexane mainly exists in a "chair"-like (kresloobraznaya) form, which possesses a minimum of energy. The C-H bindings of this form may be placed at two groups: a) those which are parallel to the OZ-axis ("a" = axial bindings) and b) those which form an angle of  $\pm 19,5^\circ$  together with the OXY-surface ("e" = equatorial bindings). Because of the not great repelling powers between the hydrogen atoms the "chair"-like form is preferred with respect to the energy. For, in the "tub"-like ("vannoobraznaya") form the distances of each equatorial hydrogen atom ( $\sim 1,83 \text{ \AA}$ ) are smaller, than the sum of two Van-der-Waal's radii. Khassel (ref. 1) has formulated a rule: in the series of the poly-substituted cyclohexanes the isomere with the greatest number of equatorial substituents is most steady.

Card 1/4 2.) In the thirties Chiurdoglu (ref. 8) has identified the

Optical Investigation of Conformations of Cis- and Trans-2- 20-3-18/52  
-Methyl-1-ethylcyclohexanols.

cis- and trans-isomeres and others of the cis- and trans-dimethylcyclohexanols, without distinguishing here the conformations. Two of the authors of the present work (ref. 9) have synthesized the substances (I) and (II) mentioned in the title and transformed them on to the known pair of cis- and trans-1.2-dimethylcyclohexanols (III) and (IV). But their "conformation" cannot be defined exactly chemically. Here, the problem is investigated by means of the method of the combination-light-scattering, and for both substances mentioned in the title spectra were found out.

3.) Guiding principles experimentally proved a.) - g.) served the authors for the investigation of the obtained optical data.  
4.) Cis- and trans-2-methyl-1-ethylcyclohexanols (I) and (II) form an intermolecular hydrogen compound in the liquid phase. This is expressed in the spectra by the fading of the frequency-band of the hydroxyl group. In solutions of these substances the faded bands disappear, because the intermolecular hydrogen bindings within the solutions are opened. The C -- OH-binding is equatorial in the isomere I, which has a frequency of the hydroxyl group  $3604\text{ cm}^{-1}$ , and axial in the isomere II with a frequency of that group  $3619\text{ cm}^{-1}$ .

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Optical Investigation of Conformations of Cis- and Trans-2-  
-Methyl-1-ethylcyclohexanols.

20-3-18/52

5.) The pulsating frequency in the spectra of the epimeres I and II is, as well in the liquid state as in solutions not single, but triplicated. The most intense frequency of the isomere I is  $682\text{ cm}^{-1}$ , of the isomere II  $693\text{ cm}^{-1}$ . The first belongs to the cis-, the latter to the trans-isomere. These frequencies remain preserved in the spectra of the solutions. Each of them occurs in the spectrum of the other substance with a weakened intensity. Because, as is said, the C--OH binding at the isomere I (= cis-isomere) is equatorial, whilst at the isomere II (= trans-) it is axial, isomere I is an epimere ep, and isomere II - an epimere ee (apart from admixtures of other conformations).

6.) This is confirmed, too, by data on the frequencies of the C--O bindings, as in the spectrum of the isomere I the frequency system within the range concerned is, compared to the spectrum of the isomere II, removed to the side of short wave-length.

7.) By the isomeres I and II the components of the molecules (ethyl- and methyl radicals, hydroxyl) possess a freedom of rotation around the single bindings. This, apparently, is the source of their conversion transformations and of the appearance of small quantities of unsteady, tub-like conformations,

Card 3/4

AUTHORS: Batuyev, M. I., Meshcheryakov, A. P., Matveyeva, A.D., 62-1-13/29

TITLE: Optical Investigation of the Structure of the Lower Polymers of Isobutylene (Opticheskoye issledovaniye stroyeniya nizshikh polimerov izobutilena)

PERIODICAL: Izvestiya AN SSSR Otdeleniye Khimicheskikh Nauk, 1958, Nr 1, pp. 75 - 84 (USSR)

ABSTRACT: The inclination of isobutylene for polymerization found for the first time by Butlerov was investigated already by himself and described in a series of papers. This was also done by Wagner, Prilezhayev, El'tekov and others. The results of the chemical and optical investigation of the structure of the polymers of isobutylene hitherto published turned out to be contradicting. In the present paper the coincidence (as to the chemical and optical aspects) in the question about the isomers prevailing in the corresponding fractions is pointed out. Beginning with the fraction of the trimer they are inactive as regards further polymerization. The active forms take part in the formation of highest polymers and do not accumulate in the lowest stages of polymerization. Furthermore it was explained that the assumption concerning a conditioned double phenomenon (or a double) in the field of the frequency of double binding in lowest polymers (by

Card 1/2



Optical Investigation of the Structure of the Lower Polymers of Isobut- 62-11329  
ylene

inversion isomerism) does not correspond to the facts [formulae  
(1) to (XVI)] . There are 1 table, and 16 references, 11 of  
which are Slavic.

ASSOCIATION: Institute of Mineral Fuels, AS USSR (Institut goryuchikh  
iskopayemykh Akademii nauk SSSR)

SUBMITTED: July 27, 1956

AVAILABLE: Library of Congress

1. Isobutylene-Polymerization

Card 2/2

*Baturev, M. I.*

AUTHORS: Baturev, M. I., Bardyshev, I. I., Matveyeva, A.D. 62-2-17/28

TITLE: The Spectra of the Combination Dispersion of the Light of Some Hydrocarbons (Spektry kombinatsionnogo rasseyaniya sveta nekotorykh uglevodorodov).

Periodical: Izvestiya AN SSSR Otdeleniye Khimicheskikh Nauk, 1958, Nr 2, pp. 232-233 (USSR).

ABSTRACT: The investigated terpenic hydrocarbons belong to the compounds of the meta-series silvestrene-isosilvestrene-silveterpinolene. For their physical constants see table 1. The spectra of the combination dispersion of these compounds were taken on a three-prism spectrograph (NCH-51). The nature of the two double bonds in the investigated compounds may be very well determined in the given optical data. In silvestrene the double bonds are far distant from each other; it may therefore be assumed that no interaction takes place between them and that they are independent. In isosilvestrene the double bonds are by one C—C member closer to each other than in silvestrene. In the latter the ethylene-substituent is in a -position, in isosilvestrene, however, in an -position (in relation to the double bond of the ring). In silveterpinolene the double bonds

Card 1/2

The Spectra of the Combination Dispersion of the Light  
of Some Hydrocarbons.

62-2-17/28

are still closer to each other and an intensive interaction takes place. The fact that one of the two double bonds is outside the ring and the other one inside the ring causes the complicated nature of interaction of the double bonds, as in silveterpinolene, butadiene-1,3 and similar systems. There are 1 table and 1 reference.

ASSOCIATION: Institute for Fossil Fuels AN USSR (Institut goryuchikh iskopayemykh Akademii nauk SSSR) and Belorussian Wood-Technical Institute imeni S.M. Kirov (Belorusskiy lesotekhnicheskiy institut imeni S.M. Kirova).

SUBMITTED: September 18, 1957

AVAILABLE: Library of Congress

1. Terpenes-Spectra
2. Hydrocarbons-Spectra
3. Terpenic hydrocarbons-Spectra
4. Terpenic hydrocarbons-Exchange reactions

Card 2/2

SOV/62-58-8-13/22

AUTHORS: Batuyev, M. I., Ponomarenko, V. A., Matveyeva, A. D.,  
          Snegova, A. D.

TITLE:     The Optical Investigation of the C - H Bond of Some Alkyl  
          Silane and Disilane Chlorides and Their Chlorine Derivatives  
          as Related to the Properties of Their Chlorination (Opticheskoye  
          issledovaniye svyazi C - H nekotorykh alkilsilan- i disilan-  
          khloridov i ikh khlorproizvodnykh v svyazi s osobennostyami ikh  
          khlorirovaniya)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk,  
          1958, Nr 8, pp. 996-1003 (USSR)

ABSTRACT:   The chlorination of methyl silane and chloromethyl silane  
          chlorides with simultaneous irradiation was first carried out  
          by Krieble and Elliot (Krieble and Elliot) and later on it was  
          investigated in detail by Speier (Speyer, Refs 2-4). Then some  
          phenomena of specifically anomalous character were found. In  
          the present paper the authors report on the result of their  
          investigation of the C - H bond as well as of some alkyl  
          silane and disilane chlorides. It turned out that along with the  
          increase in number of the chlorine atoms in silicon and in the

Card 1 2

SOV/62-58-8-13/22

The Optical Investigation of the C - H Bond of Some Alkyl Silane and Di-silane Chlorides and Their Chlorine Derivatives as Related to the Properties of Their Chlorination

alkyl chains of the alkyl silane chlorides a regular increase of the effective electron density of the corresponding C - H bonds takes place. The anomalies in the chlorination of methyl silane chloride and chloromethylsilane chloride found by other authors could not be proved by the authors. Perhaps the direction taken by the mentioned chlorination could be called an anomalous phenomenon. It is assumed that this direction is caused by spatial hindrances which complicate the whole process. There are 7 tables and 8 references, 4 of which are Soviet.

ASSOCIATION: Institut goryuchikh iskopayemykh i Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Mineral Fuels and Institute of Organic Chemistry imeni N. D. Zelinskiy, AS USSR)

SUBMITTED: January 23, 1957

Card 2/2

5(3)

AUTHORS:

~~Batuyev, M.I.~~, Akhrem, A.A.,  
Matveyeva, A.D., Nazarov, I.N.

SOV/62-58-11-20/26

TITLE:

Optical Investigation of Cis- and Trans-2-Methyl-1-Acetyl  
Cyclohexanol Conformations  
(Opticheskoye issledovaniye konformatsiy tsis- i trans-2-metil-  
-1-atsetiltsiklogeksanolv)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958,  
Nr 11, pp 1389 - 1392 (USSR)

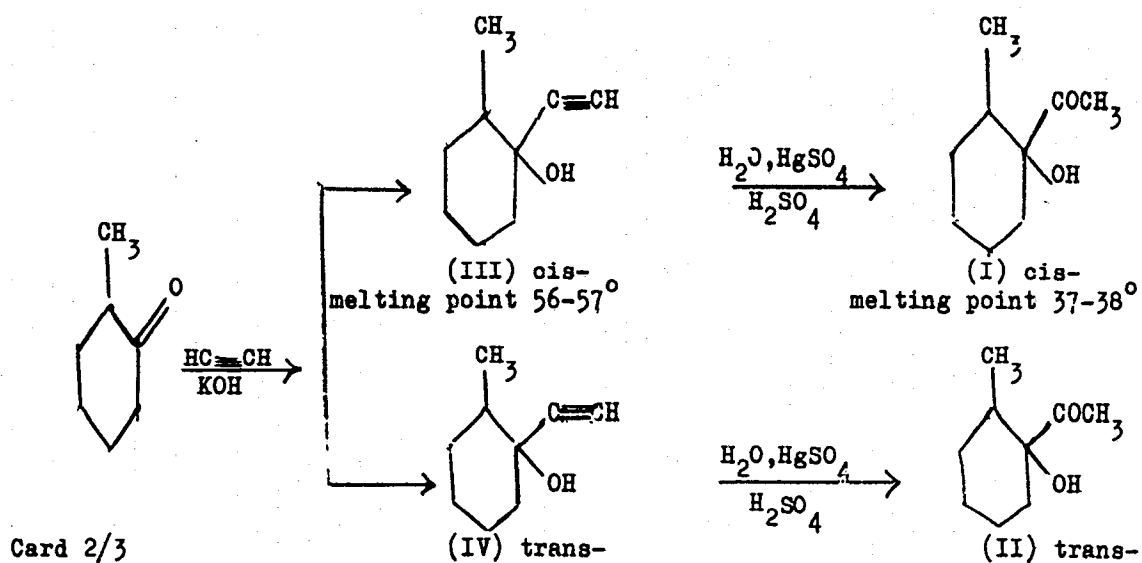
ABSTRACT:

In this brief report the authors described the investigation of  
the conformation of epimeric 2-methyl-1-acetyl cyclohexanols (I)  
and (II) obtained by means of hydration of the corresponding  
2-methyl-1-ethynyl cyclohexanols (III) and (IV) (Ref 2):

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Optical Investigation of Cis- and Trans-2-Methyl-  
-1-Acetyl Cyclohexanol Conformations

SOV/62-58-11-20/26



. Optical Investigation of Cis- and Trans-2-Methyl-  
-1-Acetyl Cyclohexanol Conformations

SOV/62-58-11-20/26

Physical properties of 2-methyl-1-acetyl cyclohexanols (I) and (II) are given in the table. It was ascertained that 2-methyl-1-acetyl cyclohexanol in the cis-configuration exists predominantly in the conformation "ae", whereas in the trans-configuration it exists in form of an "ee"-conformation. There are 2 figures, 1 table, and 5 references, 3 of which are Soviet.

ASSOCIATION: Institut goryuchikh iskopayemykh Akademii nauk SSSR  
(Institute of Mineral Fuels of the Academy of Sciences USSR)  
Institut organicheskoy khimii im.N.D.Zelinskogo Akademii nauk SSSR  
(Institute of Organic Chemistry imeni N.D.Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: April 8, 1958

Card 3/3



5(4)

AUTHORS:

Batuyev, M.I., Matveyeva, A.D.

SOV/62-58-11-21/26

TITLE:

Spectrum of the Combination Scattering of Light by Hexachloro Butadiene (Spektr kombinatsionnogo rasseyaniya sveta gekсахlor-butadiyena)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958, Nr 11, pp 1393 ~ 1395 (USSR)

ABSTRACT:

In this brief report the authors described the influence exerted by the conjugation of double bonds in hexachloro butadiene upon different aspects of the structure of this molecule. When investigating hydrocarbon molecules with multiple bonds, usually the CC bonds in ethane, ethylene and acetylene are assumed as standards. The conventional unit for the length of the CC bonds is 1,2 or 3 respectively (Ref 3). The length of the CC bonds of higher order is shortened and the frequencies of their oscillations as well as the energy are increased (Table 1). Since the multiple bonds are characteristic the mentioned mutual changes of their parameters are a regular phenomenon. On account of these regularities conclusions can be drawn on other unknown parameters (Ref 7). Although the mentioned phenomena relate to the systems

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Spectrum of the Combination Scattering of Light by  
Hexachloro Butadiene

SOV/62-58-11-21/26

$\text{Cl}_2=\text{C}(\text{Cl})-(\text{Cl})\text{C}=\text{CCl}_2$ ,  $\text{Cl}-\text{C}\equiv\text{C}-\text{C}\equiv\text{C}-\text{Cl}$ , of which the  $\text{C}=\text{C}$  and  $\text{C}\equiv\text{C}$  bonds are characteristic, with respect to these naturally hexachloro ethane ( $\text{Cl}_3\text{C}-\text{CCl}_3$ ), tetrachloro ethylene ( $\text{Cl}_2\text{C}=\text{CCl}_2$ ) and dichloro acetylene ( $\text{ClC}\equiv\text{CCl}$ ) should be assumed as standards. At present not all data on the parameters of the CC bonds in these compounds are available. Available data on the CC bonds of hexachloro ethane and tetrachloro ethylene are given (Table 2). It has been ascertained that the conjugation of two double bonds in hexachloro butadiene leads to a shortening in the length of the  $\text{C}-\text{C}$  and  $\text{C}=\text{C}$  bonds, i.e. to a certain contraction of the whole molecule. There are 1 figure, 2 tables, and 7 references, 3 of which are Soviet.

ASSOCIATION: Institut goryuchikh iskopayemykh Akademii nauk SSSR  
(Institute of Mineral Fuels of the Academy of Sciences, USSR)

Card 2/3

AUTHOR: Batuyev, M. I.

SOV/79-28-10-60/60

TITLE: In the Order of Discussion (V poryadke diskussii) On the Linkage Arrangement in Butadiene and Its Twofold Reactivity (O sopryazhenii v butadiyene i yego dvoystvennoy reaktsionnoy sposobnosti)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 10, pp 2903-2907 (USSR)

ABSTRACT: A prevalent chemical theory explains the twofold reactivity of the  $\pi$ -conjugated systems by the mesomeric structure of the molecules themselves, outside the reaction, as well as by the intermediary carbonium ions formed in the course of the reaction. According to this theory, the molecule of butadiene-1,3, as a consequence of the mesomeric effect (the effect of the static linkage), can no longer be represented by the classical structure formula (I), but can only be represented by the formulae of the types (II), (III), (IV):

$$\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2, \text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2 \longleftrightarrow \text{CH}_2=\text{C}-\text{CH}=\text{CH}_2$$

(I) (II)

$$\text{C}=\text{C}=\text{C}-\text{C}, \text{C}=\text{C}=\text{C}=\text{C}$$

(III) (IV)

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In the Order of Discussion. SOV/79-28-10-60/60  
On the Linkage Arrangement in Butadiene and its Twofold Reactivity

The adherents of this theory tried to substantiate it by direct physical experiments; however, after a detailed study of the experimental material available, the authors are of the opinion that this view can no longer correspond to facts. After extensive experimental investigations described in the paper under consideration, and from the theoretical considerations based on these investigations, they arrive at the conclusion that the systems investigated by them (butadiene-1,3, diacetylene, hexachloro butadiene) do not contain any of the mesomeric structures with balanced compounds as proposed in the above-mentioned theory, and that, in particular, their bonds are not extended. The first reaction stage, the polarization of the agent and the attachment of its cation to the end of the molecule, is explained by the increased electron density of the methylene groups of butadiene-1,3. The twofold reactivity of butadiene-1,3 is realized at the second reaction stage and is ultimately conditioned by the separate spatial presence of the structurally different ions (VIII) and (IX) which merge tautomerically. There are 31 references, 21 of which are Soviet.

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In the Order of Discussion. SOV/79-28-10-60/60  
On the Linkage Arrangement in Butadiene and Its Twofold Reactivity

ASSOCIATION: Institut goryuchikh iskopayemykh Akademii nauk SSSR  
(Institute of Mineral Fuels of the Academy of  
Sciences, USSR)

SUBMITTED: January 22, 1957

Card 3/3

AUTHOR: Batuyev, M. I.

SOV/79-28-11-55/55

TITLE: ~~A Topic of Discussion~~ (V poriadke diskussii)  
On the Problem of Conjugation in Benzene (K voprosu o  
sopryazhenii v benzole)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 11, pp 3147-3154  
(USSR).

ABSTRACT: 90 years have passed since the introduction of the benzene  
formula  $\begin{array}{c} \text{CH}=\text{CH}-\text{CH} \\ | \quad \quad | \\ \text{CH}=\text{CH}-\text{CH} \end{array}$

by A. M. Butlerov. A great number of benzene formulae have been suggested since then. The formula given by Butlerov based on the ideas of Kekulé on the structure of the aromatic nucleus is, however, time and again mentioned to be the one closest to reality (Refs 8-10). Ingold (Ingol'd - Ref 11) showed in his representation of the resonance-mesomeric theory of the chemical binding that if only chemical facts are taken into account the formula by Kekulé (i.e. Butlerov-Kekulé, M. Baluyev) is doubtlessly the best. On the basis of this theory developed by Ingold and other scientists from this

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**A Topic of Discussion**

On the Problem of Conjugation in Benzene

SOV/79-28-11-55/55

formula deductively and automatically (Refs 11-13) the basic physical properties of benzene are predicted which contradict the formula by Butlerov-Kekulé, and can directly explain the symmetry of benzene only by a plane regular hexagon ( $-D_{6h}$ ).

The authors of this prediction resort to physical experimental experiments, however, in the thirties, the physical experiment was not sufficiently developed with respect to the individual bonds in the molecule specifically to be determined, so that wrong conclusions were drawn. The author shows that on the basis of the most important physical and chemical results mentioned in a large number and obtained in recent times the mentioned ideas of the benzene structure by Butlerov and Kekulé can no longer be advocated. Thus, the experimental results obtained hitherto do not at all prove the symmetry of the benzene molecule  $D_{6h}$ . On the contrary they tend to favor the Butlerov-Kekulé formula, i.e. a nucleus with three conjugated somewhat lengthened double bonds and three shortened single bonds in the nucleus, with the benzene molecule being characterized only approximately by the symmetry  $D_{3h}$ .

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**A Topic of Discussion**  
On the Problem of Conjugation in Benzene

SOV/79-28-11-55/55

There are 2 tables and 40 references, 15 of which are Soviet.

ASSOCIATION: Institut goryuchikh iskopayemykh Akademii nauk SSSR  
(Institute of Mineral Fuels of the Academy of Sciences  
USSR)

SUBMITTED: June 2, 1957

Card 3/3

USCOMM-DC-60,563



SOV/20-120-4-25/67

AUTHORS: Batuyev, M. I., Akhrem, A. A., Matveyeva, A. D.,  
Kamernitskiy, A. V., Nazarov, I. N., Member, Academy of  
Sciences, USSR (Deceased)

TITLE: Optical Investigation of the Conformations of Some Gem-Sub-  
stituted Cyclohexanes (Opticheskoye issledovaniye konfor-  
matsiy nekotorykh gem-zameshchennykh tsiklogeksanov)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 4, pp. 779-782  
(USSR)

ABSTRACT: The physical properties and the reactivity of the functional  
group depend on its position and conformation. The position  
can be axial or equatorial. This can sometimes be determined  
chemically but frequently only by means of physical methods  
(Refs 1, 2). The authors deal with the optical determination  
of the conformation of epimeric 2-methyl-1-ethynyl cyclo-  
hexanols (I), (II), furthermore, with that of 1,2-dimethyl  
cyclohexanols (III), (IV) which they had already earlier  
synthesized (Ref 3); the method is described in short and a  
survey of publications is given (Refs 3, 4). Formerly the  
acetylene alcohols (I) and (II) were traced back by the

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SOV/20-120-4-25/67

## Optical Investigation of the Conformations of Some Gem-Substituted Cyclohexanes

authors to the well known pair of cis- and trans-carbinols (III) and (IV) without touching the asymmetric center (Ref 3). The physical properties of the produced compounds (I) - (IV) are shown in table 1. The spectra of the combination light dispersion in the liquid phase were taken on the spectrogram ISP -51 of a mercury lamp having a chamber of the exciting blue line of 4358 Å. The numerical results of these measurements are given together with data on the intensity of the lines. Furthermore, spectra were taken of 10 % solutions of the first 2 substances in carbon tetrachloride. The presence of the 2 isomers I and II and of their solutions in CCl<sub>4</sub> in the spectra in the range of 3 - 4 (instead of only one)<sup>4</sup> characteristic frequencies of other weak lines (Table 2) tends to show, that other conformations are present in small numbers (possibly even in bath-tub shape) in the mixture where conformations prevail. The prevailing conformation in the cis-isomer (I) is "ae" (according to Ref 1) whereas in the trans-isomer it is "ee" (see scheme). In the ae-conformation the influence of the cycle on the hydroxyl group in the equatorial position is more intensive than in "ee", where it is in axial position. In the ae-conformation the

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SOV/20-120-4-25/67

## Optical Investigation of the Conformations of Some Gem-Substituted Cyclohexanes

hydroxyl group is more protonized than the axial group in "ee". On the other hand the bindings  $\text{O}=\text{C}$ ,  $\text{O}-\text{C}$  in  $-\text{C}=\text{CH}$  in the equatorial position which they take in the "ee" conformation are more amply supplied with electrons. That means they have higher oscillation frequencies, binding energies and a shorter interatomic distance than they would have in an axial position in an "ae" conformation (Refs 1, 6). The interaction between reactivity and conformation in the series of cyclohexane derivatives was already at an earlier time observed by the authors. (Ref 7). Cis- $\alpha$ -ketole (V) which was obtained from an equatorial acidous hydroxyl can be acylated under milder conditions than trans- $\alpha$ -ketole (VI) which was produced from (II) with the hydroxyl being in an axial position. There are 2 tables and 7 references, 4 of which are Soviet.

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SOV/20-120-4-25/67

Optical Investigation of the Conformations of Some Gem-Substituted Cyclohexanes

ASSOCIATION: Institut organicheskoy khimii Akademii nauk SSSR  
(Institute of Organic Chemistry AS USSR).  
Institut goryuchikh iskoravemvkh Akademii nauk SSSR  
(Institute of Mineral Fuels AS USSR)

SUBMITTED: February 13, 1958

1. Cyclohexanes--Optical analysis 2. Cyclohexanes--Physical  
properties 3. Substitution reactions 4. Hydroxyl radicals  
--Chemical effects

Card 4/4

5/4)

**AUTHORS:**

Batuyev, M. I., Akhrem, A. A.,  
Kamernitskiy, A. V., Matveyeva, A. D.

SOV/62-59-3-31/37

**TITLE:**

Optical Investigation of the Conformations of the Cis- and Trans-methyl Esters of 3-Methyl Cyclohexanol Carboxylic Acids (Opticheskoye issledovaniye konformatsiy tsis- i trans-metilovykh efirov 3-metiltsiklogeksanolkarbonovykh kislot)

**PERIODICAL:**

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 3, pp 556-558 (USSR)

**ABSTRACT:**

This is a brief communication on the investigation of the cis- and trans-methyl esters of 3-methyl cyclohexanol carboxylic acids which were synthesized according to the scheme described in reference 1. The physical properties of the products obtained are given in the table. It is known that the Auers-Skit formula for the cis- and trans-configurations of 1,3-disubstituted cyclohexanes may be applied in the reversible form. The same holds also for the esters investigated: the cis-compound has a lower density and a smaller refraction index than the trans-compound. The Raman spectra of the esters were recorded in the liquid phase by means of the ISP-51 spectrograph with a medium camera of the exciting line 4358 of the

Card 1/2

Optical Investigation of the Conformations of the SOV/62-59-3-31/37  
Cis- and Trans-methyl Esters of 3-Methyl Cyclohexanol Carboxylic Acids

quartz lamp. The cis- and trans-methyl esters of 3-methyl cyclohexanol carboxylic acids investigated are mixtures of reversible isomers  $1e3e \rightleftharpoons 1a3a$  and  $1e3a \rightleftharpoons 1a3e$ . In the second conformation  $1e3a$  mainly the first  $1e3e$  is present. Moreover, in each of these mixtures admixtures of one conformation are contained in the other. There are 1 table and 3 references, 1 of which is Soviet.

ASSOCIATION: Institut goryuchikh iskopayemykh Akademii nauk SSSR (Institute of Mineral Fuel of the Academy of Sciences, USSR). Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: July 30, 1958

Card 2/2

5(4)

AUTHORS:

Batuyev, M. I., Meshcheryakov, A. P., Matveyeva, A. D. SOV/62-59-8-26/42

TITLE:

Raman Spectra of Divinyl Acetylene

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 8, pp 1485-1487 (USSR)

ABSTRACT:

The spectra were photographed by means of the spectrograph of the type ISP-51 with the Hg line (4358 Å). The individual lines obtained for the compound  $\text{CH}_2 = \text{CH}-\text{C}\equiv\text{C}-\text{CH}=\text{CH}_2$  are given. Within the range of the triple bond two basic frequencies (intensive doublet) were obtained at 2165 and 2206  $\text{cm}^{-1}$ , and four frequencies in the range of the double bonds (intensive doublet), at 1586, 1601  $\text{cm}^{-1}$ , and two weaker lines at 1629  $\text{cm}^{-1}$ . The appearance of the doublet is due to the possibility of the existence of rotatory isomers. The splitting-up of the frequencies of the double bonds is interpreted as the splitting of the frequency of the bond oscillations of two identical double bonds in each of the two possible isomers. The great number of lines (44 as against 30 in the case of one form only) is considered to point to the probable existence of both isomers.

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## Raman Spectra of Divinyl Acetylene

SOV/62-59-8-26/42

The multiple bonds must, according to the energy minimum of the bond system, lie in one plane. On this condition the two isomers (the cis (I) and trans forms (II)) are possible. The authors continue by attributing the several lines obtained to the two isomers by means of comparing them with the infrared spectrum. The lines are also interpreted as resulting from the mutual influence of double bond - triple bond and double bond - double bond. A table lists the frequencies of the oscillations of the individual bond types. It follows that the triple bond in (I) with a high electron density corresponds to a pair of double bonds with a reduced electron density, while the triple bond in (II) with a reduced electron density corresponds to a pair of double bonds with a high electron density. The electron shells of the C atoms of the triple bond in (I) are more asymmetrical than in (II) so that there is a greater influence of this bond upon the double bonds in (I) than there is in (II). In the liquid

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Raman Spectra of Divinyl Acetylene

SOV/62-59-8-26/42

phase both isomeric forms are encountered; however, there is a marked preponderance of the trans form. There are 1 table and 9 references, 4 of which are Soviet.

ASSOCIATION: Institut <sup>o</sup> goryuchikh iskopayemykh ; Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR ( Institute of Mineral Fuels; Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: January 21, 1959

Card 3/3

5(4)

AUTHORS:

Batuyev, M. I., Akhrem, A. A., Matveyeva, A. D.

SOV/62-59-9-25/40

TITLE:

Optical Investigation of Equatorial and Axial Carbonyl Groups of Some Substituted Cyclohexanes

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 9, pp 1565-1668 (USSR)

ABSTRACT:

The Raman spectra of the following compounds in the liquid phase, taken by means of the ISP-51 spectrograph and the E-612 Hilger spectrograph are investigated: Acetoxy-cyclohexane (I), acetyl-cyclohexane (II), 1-acetoxy-1-acetylcyclohexane (III), cis-2-methyl-1-acetoxy-1-acetylcyclohexane (IV), and trans-2-methyl-1-acetoxy-1-acetylcyclohexane (V). The physical data of the compounds are given in the table. The frequencies obtained are given in  $\Delta\nu = \text{cm}^{-1}$ . The configuration of the compounds (IV) and (V) was determined from the results of special analysis. Taking the largest substituent as basis, the conformation of (IV) was found to be trans-ee and trans-aa, that of (V) cis-ae and cis-ea.

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Optical Investigation of Equatorial and Axial Carbonyl Groups of Some Substituted Cyclohexanes SOV/62-59-9-25/40

The amounts of these isomers were found to be fairly equal in both cases, as was also the case for the two possible conformations of compound (III), of which equal amounts are formed. There are 4 tables and 2 Soviet references.

ASSOCIATION: Institut goryuchikh iskopyayemykh Akademii nauk SSSR (Institute for Combustible Mineral Resources of the Academy of Sciences, USSR), Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: January 21, 1959

Card 2/2

5(3).

AUTHORS:

Batuyev, M. I., Akhrem, A. A., Kamernitskiy, A. V., Matveyeva, A. D.

SOV/62-59-9-26/40

TITLE:

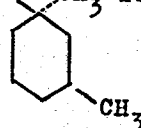
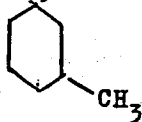
Optical Investigation of the Conformations of Cis and Trans-1,3-dimethylcyclohexanols

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 9, pp 1668-1670 (USSR)

ABSTRACT:

A reaction scheme for the synthesis of the substances investigated, (I) OH-CN and (II) OH-CH<sub>3</sub> is given from a previous paper.



The Auer-Skit transformation rule is valid for compounds (I) and (II) (Table). The Raman spectra of the compounds were taken in the liquid phase and in carbon tetrachloride solution. From the data obtained, the following conclusions were drawn: The alcohols form intermolecular hydrogen bonds in solution (bands split up into lines in the 3160-3530 cm<sup>-1</sup> range). These hydrogen bonds do not

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Optical Investigation of the Conformations of  
Cis and Trans-1,3-dimethylcyclohexanols

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stem from the hydroxyl group. In the liquid phase complexes are formed by hydrogen bonding of the OH-group (continuous bands in the 3600 and 3614  $\text{cm}^{-1}$  region). The hydroxyl groups generally have a similar position (equatorial) in the associated complex. Thus, in (I) their position is cis-1a3a and in (II) trans-1a3e. Their position was determined at cis-1e3e in (I) and trans-1a3e and trans-1e3a in (II) (equatorial and equatorial-axial), relative to the  $\text{CH}_3$ -group outside the hydrogen bond as the largest substituent. If one disregards the nomenclature of these configurations and conformations by reason of their formation, and regards solely their real structure, deduced from their physical properties, as well as taking into account the transformation rule by Barton and Hassel (the configuration is determined by the position of the largest substituent) one would have to redefine the cis-1a3a conformation of (I), the form predominant in associated molecules, of (I), and also the

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trans-1a3e conformation of (II). The nomenclature of these conformations would then be trans-1e3a and cis-1e3a respectively. There are 1 table and 3 Soviet references.

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AUTHORS:

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A. D., Vzenkova, G. Ya.

TITLE:

Optical Investigation of Alkylgermanium Chlorides in  
Connection With Some Peculiarities of Their Chemical  
Behavior

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh  
nauk, 1959, Nr 12, pp 2226-2233 (USSR)

ABSTRACT:

Several studies of similar content were published by the  
authors previously (Zh. obshch. khimii, 1956, Vol 26,  
p 2336; this journal, 1956, p 1070; *ibid.*, 1957, p 515;  
*ibid.*, 1958, p 996). The authors showed that many  
chemical characteristics distinguishing organosilicon  
compounds from carbon compounds are also present, and  
even more pronounced, in organogermanium compounds (this  
journal, 1956, p 1146; *ibid.*, 1957, Nr 8, p 994; *ibid.*,  
Nr 2, p 199; Dokl. AN SSSR, 1954, Vol 94, p 485; this  
journal, 1957, Nr 3, p 310). Methyltrichlorogermane  
and methyltrichlorosilane, unlike ethyltrichlorogermane

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and ethyltrichlorosilane, could not be chlorinated with sulfur chloride. Ethyltrichloro-compounds of both germanium and silicon were easily chlorinated but the  $\beta$ -directing effect of the  $\text{GeCl}_3$ -group was considerably stronger than that of the  $\text{SiCl}_3$ -group. Chlorination of  $\text{CH}_3\text{GeCl}_3$ ,  $(\text{CH}_3)_2\text{GeCl}_2$ , and similar compounds to di- and trichlorides proceeded more rapidly than the chlorination of the corresponding silicon compounds. The yield of germanium monochlorides was lower than that of the corresponding silicon compounds. Dehydrochlorination of  $\text{Cl}_3\text{GeCH}_2\text{CH}_2\text{Cl}$  with quinoline yielded  $\text{Cl}_3\text{GeCH}=\text{CH}_2$  as main product, and also  $\text{GeCl}_4$ , whereas practically no  $\text{SiCl}_4$  was obtained on dehydrochlorination of  $\text{Cl}_3\text{SiCH}_2\text{CH}_2\text{Cl}$ . This can be explained by an easier  $\beta$ -elimination in  $\beta$ -chloroethyltrichlorogermane than in  $\beta$ -chloroethyltrichlorosilane. These

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peculiarities of the chemical behavior of Ge are due in the first place to its physicochemical properties; some of these were optically investigated by the authors (this journal, 1956, p 1243). The present study deals with investigation of the vibrational frequencies of C—H bonds in methylene and methyl groups of tetraethylgermane, and ethyl-, methyl-, chloroethyl- and chloromethylgermanium as compared with vibrational frequencies of the corresponding silicon compounds and normal paraffins. Spectrograph ISP-51 was used in the study, and Raman spectra of 11 germanium compounds were investigated. A possible explanation for the behavior of Ge and Si compounds is advanced. In chlorination of  $\text{CH}_3\text{CH}_2\text{GeCl}_3$ , the electrophilic Cl-atoms of  $\text{SO}_2\text{Cl}_2$  should be apparently directed toward electronegative C—H bonds at atoms adjacent to the germanium atom. However, Ge has a larger electron shell than Si; also, the negative pole of the  $\text{CH}_3\text{CH}_2\text{GeCl}_3$  molecule is concentrated in the region of Cl-atoms. These factors do not allow the

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other, more negative, end of  $\text{SO}_2\text{Cl}_2$  molecule to approach the region of the methylene C—H bonds; the molecule moves away from the methylene bond region toward the methyl group, and the chlorination proceeds in the  $\beta$ -position to a much greater extent than in the chlorination of  $\text{CH}_3\text{CH}_2\text{SiCl}_3$ . The ratio of  $\alpha$  to  $\beta$  isomers in the chlorination of  $\text{CH}_3\text{CH}_2\text{GeCl}_3$  with sulfuryl chloride in presence of benzoyl peroxide was 1:9, whereas in chlorination of  $\text{CH}_3\text{CH}_2\text{SiCl}_3$  this ratio was only 1:2.5. It is also evident that the deflection of the  $\text{SO}_2\text{Cl}_2$  molecule from the methyl group adjacent directly to Ge-atom in  $\text{CH}_3\text{GeCl}_3$  due to the above factors hinders the chlorination of this compound. The Raman spectrum of  $\beta$ -chloroethyltrichlorogermane showed a considerably higher number of lines (15 lines more) than the number expected theoretically, and a twofold increase of the vibrational frequency of methylene C—H bonds. This indicated the possible

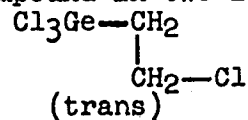
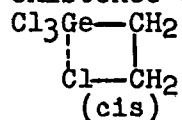
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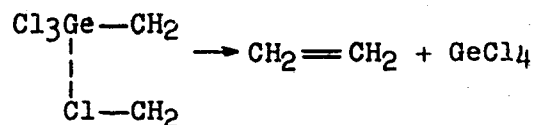
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existence of the above compound in two isomeric forms:



Intramolecular interaction Ge....Cl in the cis-  
isomer can promote  $\beta$ -elimination:



The formation of  $\text{GeCl}_4$  on dehydrochlorination of  
chloroethyltrichlorogermane with quinoline can  
thus be explained. There are 8 tables; and

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14 references, 1 U.S., 2 U.K., 11 Soviet.  
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